Part No. P0609323 2.0
March 25, 2004

# Business Communications Manager

# BCM200/400
# Installation and Maintenance Guide

NORTEL NETWORKS™

## Copyright © 2003 Nortel Networks

All rights reserved. July, 2003.

The information in this document is subject to change without notice. The statements, configurations, technical data, and recommendations in this document are believed to be accurate and reliable, but are presented without express or implied warranty. Users must take full responsibility for their applications of any products specified in this document. The information in this document is proprietary to Nortel Networks NA Inc.

## Trademarks

NORTEL NETWORKS and Business Communications Manager, are trademarks of Nortel Networks NA Inc.

Microsoft, MS, MS-DOS, Windows, and Windows NT are registered trademarks of Microsoft Corporation.

Symbol, Spectrum24, and NetVision are registered trademarks of Symbol Technologies, Inc.

All other trademarks and registered trademarks are the property of their respective owners.


# North American Regulatory Information

## Safety

Business Communications Manager equipment meets all applicable requirements of both the CSA C22.2 No.60950 and UL 60950 Edition 3.

**Danger:** Risk of shock.
Read and follow installation instructions carefully.
Ensure the Business Communications Manager and Business Communications Manager expansion unit are unplugged from the power socket and that any telephone or network cables are unplugged before opening the Business Communications Manager or Business Communications Manager expansion unit.
If installation of additional hardware and /or servicing is required, disconnect all telephone cable connections prior to unplugging the Business Communications Manager.
Ensure the Business Communications Manager and Business Communications Manager expansion unit are plugged into the wall socket using a three-prong power cable before any telephone cables are connected.

**Caution:** Only qualified persons should service the system.
The installation and service of this hardware is to be performed only by service personnel having appropriate training and experience necessary to be aware of hazards to which they are exposed in performing a task and of measures to minimize the danger to themselves or other persons.
Electrical shock hazards from the telecommunication network and AC mains are possible with this equipment. To minimize risk to service personnel and users, the Business Communications Manager system must be connected to an outlet with a third-wire ground. Service personnel must be alert to the possibility of high leakage currents becoming available on metal system surfaces during power line fault events near network lines. These leakage currents normally safely flow to Protective Earth ground via the power cord. Therefore, it is mandatory that connection to an earthed outlet is performed first and removed last when cabling to the unit. Specifically, operations requiring the unit to be powered down must have the network connections (central office lines) removed first.

## Enhanced 911 Configuration

**Caution:** Warning
Local, state and federal requirements for Emergency 911 services support by Customer Premises Equipment vary. Consult your telecommunication service provider regarding compliance with applicable laws and regulations.

**Note:** For information about 911 configuration, refer to the **Enhanced 911 (E911) Configuration** section in the *Business Communications Manager Programming Operations Guide*.

## Radio-frequency Interference

**Warning:** Equipment generates RF energy.
This equipment generates, uses, and can radiate radio-frequency energy. If not installed and used in accordance with the installation manual, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Part 15 of the FCC Rules and with ICES.003, CLASS A Canadian EMI Requirements. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his or her own expense, will be required to take whatever measures may be required to correct the interference.

## Telecommunication Registration

Business Communications Manager equipment meets all applicable requirements of both Industry Canada CS-03 and US Federal Commission FCC Part 68 and has been registered under files Industry Canada 332D-5980A and FCC US: AB6KF15B20705 (key system), US: AB6MF15B20706 (hybrid system), and US: AB6PF15B23740 (PBX system). Connection of the Business Communications Manager telephone system to the nationwide telecommunications network is made through a standard network interface jack that you can order from your local telecommunications company. This type of customer-provided equipment cannot be used on party lines or coin lines.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment. Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

**Caution:** Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician.

## Network Connection

*Canada and US*

**Table 1** Interface harmonized standards

| Interface | Harmonized Standard | Description |
|---|---|---|
| CTM | Industry Canada CS03<br>FCC Part 68 | Analog terminal device |
| DTM | Industry Canada CS03<br>FCC Part 68 | T1 and Primary Rate ISDN |
| BRIM | Industry Canada CS03<br>FCC Part 68 | Basic Rate ISDN |
| WAN | Industry Canada CS03<br>FCC Part 68 | T1 |

## Hearing Aid Compatibility

Business Communications Manager telephones are hearing-aid compatible, as defined in Section 68.316 of Part 68 FCC Rules.

## Electromagnetic Compatibility

Business Communications Manager equipment meets all FCC Part 15, Class A radiated and conducted emissions requirements.

Business Communications Manager does not exceed the Class A limits for radiated and conducted emissions from digital apparatus as set out in the Radio Interference Regulations of Industry Canada.

## Telephone Company Registration

It is usually not necessary to call the telecommunications company with information on the equipment before connecting the Business Communications Manager system to the telephone network. If the telecommunications company requires this information, provide the following:

- telephone number(s) to which the system will be connected
- FCC registration number (on label affixed to Business Communications Manager)
- universal service order code (USOC)
- service order code (SOC)
- facility interface code (FIC)

## Use of a Music Source

In accordance with U.S. Copyright Law, a license may be required from the American Society of Composers, Authors and Publishers, or similar organization if Radio or TV broadcasts are transmitted through the Music On Hold or Background Music features of this telecommunication system.

Nortel Networks hereby disclaims any liability arising out of the failure to obtain such a license.

## Rights of the Telecommunications Company

If the Business Communications Manager system is causing harm to the telephone network, the telecommunications company may discontinue service temporarily. If possible, the telecommunications company will notify you in advance. If advance notice is not practical, the user will be notified as soon as possible. The user will be given the opportunity to correct the situation and informed of the right to file a complaint to the FCC.

The telecommunications company may make changes in its facilities, equipment, operations or procedures that could affect the proper functioning of the system. If this happens, the telecommunications company will give you advance notice in order for you to make any necessary modifications to maintain uninterrupted service.

## Repairs

In the event of equipment malfunction, all repairs to certified equipment will be performed by an authorized supplier.

## Canadian Regulations - please read carefully

### *Notice*

The term "IC" before the certification number located on the host equipment only signifies that the Industry Canada technical specifications were met. The Department does not guarantee the equipment will operate to the user's satisfaction. Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to

request the user to disconnect the equipment. Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

**Caution:** Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

### *Notice*

The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the RENs of all the devices does not exceed 5.

This Class A device complies with Part 68 & Part 15 of the FCC Rules and ICES-003 Class A Canadian EMI requirements. Operation is subject to the following two conditions (1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

Do not attempt to repair this equipment. If you experience trouble, write for warranty and repair information:

Nortel Networks
30 Norelco Drive, Weston, Ontario
M9L 2X6 Canada

## US Regulations - please read carefully

### Federal Communications Commission (FCC) Notice

FCC registration number: This telephone equipment complies with Part 68, Rules and Regulations, of the FCC for direct connection to the Public Switched Telephone Network. (The FCC registration number appears on a sticker affixed to the bottom of the telephone.)

Your connection to the telephone line must comply with these FCC rules:

- An FCC compliant telephone cord and modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network premises wiring using a compatible modular jack which is Part 68 compliant. See installation instructions for details.
- Use only an FCC Part 68-compliant Universal Service Order Code (USOC) network interface jack, as specified in the installation instructions, to connect this telephone to the telephone line. (To connect the phone, press the small plastic tab on the plug at the end of the phone’s line cord. Insert into a wall or baseboard jack until it clicks. To disconnect, press the tab and pull out.) See installation instructions for details.

- If the terminal equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of the product may be required. But if advance notice isn't practical, the telephone company will notify you as soon as possible. You will also be advised of your right to file a complaint with the FCC, if you believe it is necessary.
- If a network interface jack is not already installed in your location, you can order one from your telephone company. Order the appropriate USOC Network interface jack, as specified in the installation instructions, for wall-mounted telephones or for desk/table use. In some states, customers are permitted to install their own jacks.
- Your telephone may not be connected to a party line or coin telephone line. Connection to Party Line Service is subject to state tariffs. (Contact the state public utility commission, public service commission or corporation commission for information.)
- It is no longer necessary to notify the Telephone Company of your phone's Registration and REN numbers. However, you must provide this information to the telephone company if they request it. The telephone company may make changes in its facilities, equipment, operation or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modification to maintain uninterrupted service.
- Do not attempt to repair this equipment. If you experience trouble, write for warranty and repair information:

  Nortel Networks
  640 Massman Drive,
  Nashville, TN, 37210, USA

### *Ringer Equivalence Number*

The FCC Registration label (on bottom of phone), includes a Ringer Equivalence Number (REN), which is used to determine the number of devices you may connect to your phone line. A high total REN may prevent phones from ringing in response to an incoming call and may make placing calls difficult. In most areas, a total REN of 5 should permit normal phone operation. To determine the total REN allowed on your telephone line, consult your local telephone company.

### *Hearing Aids*

This phone is compatible with hearing aids equipped with an appropriate telecoil option.

### *Programming Emergency Numbers*

When programming emergency numbers and/or making test calls to emergency numbers:

**1** Remain on the line and briefly explain to the dispatcher the reason for calling before hanging up.

**2** Perform such activities in the off-peak hours, such as early mornings or late evenings.

## EMI/EMC (FCC Part 15)

**Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## Important Safety Instructions

The following safety instructions cover the installation and use of the Product. Read carefully and retain for future reference.

### *Installation*

**Warning:** To avoid electrical shock hazard to personnel or equipment damage observe the following precautions when installing telephone equipment:

1. Never install telephone wiring during a lightning storm.
2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
4. Use caution when installing or modifying telephone lines. The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

This symbol on the product is used to identify the following important information: Use only with a CSA or UL certified CLASS 2 level C power supply, as specified in the user guide.

### *Use*

When using your telephone equipment, basic safety precautions should always be followed to reduce risk of fire, electric shock and injury to persons, including the following:

**1** Read and understand all instructions.

**2** Follow the instructions marked on the product.

**3** Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

**4** Do not use this product near water, for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool.

**5** Do not place this product on an unstable cart, stand or table. The product may fall, causing serious damage to the product.

**6** This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.

**7** Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by persons walking on it.

**8** Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.

**9** Never spill liquid of any kind on the product.

**10** To reduce the risk of electric shock do not disassemble this product, but have it sent to a qualified service person when some service or repair work is required.

**11** Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

- **a** When the power supply cord or plug is damaged or frayed.
- **b** If the product has been exposed to rain, water or liquid has been spilled on the product, disconnect and allow the product to dry out to see if it still operates; but do not open up the product.
- **c** If the product housing has been damaged.
- **d** If the product exhibits a distinct change in performance.

**12** Avoid using a telephone during an electrical storm. There may be a remote risk of electric shock from lightning.

**13** Do not use the telephone to report a gas leak in the vicinity of the leak.

**14** **Caution:** To eliminate the possibility of accidental damage to cords, plugs, jacks, and the telephone, do not use sharp instruments during the assembly procedures.

**15** **Warning:** Do not insert the plug at the free end of the handset cord directly into a wall or baseboard jack. Such misuse can result in unsafe sound levels or possible damage to the handset.

**16** Save these instructions.

# International Regulatory Information

| | | |
|---|---|---|
| CE | The CE Marking on this equipment indicates compliance with the following:<br>This device conforms to Directive 1999/5/EC on Radio Equipment and Telecommunications Terminal Equipment as adopted by the European Parliament And Of The Council. | |

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Hereby, Nortel Networks declares that Business Communications Manager Model No. NT7B10xxxx, is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Information is subject to change without notice. Nortel Networks reserves the right to make changes in design or components as progress in engineering and manufacturing may warrant. This equipment has been tested and found to comply with the European Safety requirements EN 60950 and EMC requirements EN 55022 (Class A) and EN 55024. These EMC limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial and light industrial environment.

***WARNING***

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures. The above warning is inserted for regulatory reasons. If any customer believes that they have an interference problem, either because their Nortel Networks product seems to cause interference or suffers from interference, they should contact their distributor immediately. The distributor will assist with a remedy for any problems and, if necessary, will have full support from Nortel Networks.

## Safety

***WARNING!***

Only qualified service personnel may install this equipment. The instructions in this manual are intended for use by qualified service personnel only.

***Risk of shock.***

Ensure the Business Communications Manager is unplugged from the power socket and that any telephone or network cables are unplugged before opening the Business Communications Manager.

Read and follow installation instructions carefully

***Only qualified persons should service the system.***

The installation and service of this hardware is to be performed only by service personnel having appropriate training and experience necessary to be aware of hazards to which they are exposed in performing a task and of measures to minimize the danger to themselves or other persons.

Electrical shock hazards from the telecommunication network and AC mains are possible with this equipment. To minimize risk to service personnel and users, the Business Communications Manager system must be connected to an outlet with a third-wire Earth.

Service personnel must be alert to the possibility of high leakage currents becoming available on metal system surfaces during power line fault events near network lines. These leakage currents normally safely flow to Protective Earth via the power cord. Therefore, it is mandatory that connection to an earthed outlet is performed first and removed last when cabling to the unit. Specifically, operations requiring the unit to be powered down must have the network connections (exchange lines) removed first.

## Additional Safety Information

The following interfaces are classified as Telecommunication Network Voltage (TNV) circuits, and may be connected to exposed plant:

- DTM interface
- WAN interface
- TCM Isolator
- ASM8+: The Nortel Networks ASM8+ I/O ports are designated as OPX. This product does provide Telecommunications Ringing Voltages and can be configured to provide Voltage Message Waiting Indicator (VMWI). Installation of this device and all connections to this device must be performed by Qualified Installation Personnel who are aware of the hazards associated with telecommunications wiring and are aware of the local regulations for treatment of telecommunications wiring for OPX deployment.

The following interfaces are classified as Safety Extra Low Voltage (SELV) circuits, and shall not be connected to exposed plant:

- BRIM Interface
- TCM extensions
- external music sources (MSCX)
- auxiliary ringer (AUX)
- paging system relay (PAGE)
- serial port
- LAN interface

The following interfaces are classified as Telecommunication Network Voltage (TNV) circuits, and shall NOT be connected to exposed plant:

- ATA II

# Limited Warranty

Nortel Networks warrants this product against defects and malfunctions during a one (1) year period from the date of original purchase. If there is a defect or malfunction, Nortel Networks shall, at its option, and as the exclusive remedy, either repair or replace the telephone set at no charge, if returned within the warranty period.

If replacement parts are used in making repairs, these parts may be refurbished, or may contain refurbished materials. If it is necessary to replace the telephone set, it may be replaced with a refurbished telephone of the same design and color. If it should become necessary to repair or replace a defective or malfunctioning telephone set under this warranty, the provisions of this warranty shall apply to the repaired or replaced telephone set until the expiration of ninety (90) days from the date of pick up, or the date of shipment to you, of the repaired or replacement set, or until the end of the original warranty period, whichever is later. Proof of the original purchase date is to be provided with all telephone sets returned for warranty repairs.

## Exclusions

Nortel Networks does not warrant its telephone sets to be compatible with the equipment of any particular telephone company. This warranty does not extend to damage to products resulting from improper installation or operation, alteration, accident, neglect, abuse, misuse, fire or natural causes such as storms or floods, after the telephone is in your possession.

Nortel Networks shall not be liable for any incidental or consequential damages, including, but not limited to, loss, damage or expense directly or indirectly arising from the customers use of or inability to use this telephone, either separately or in combination with other equipment. This paragraph, however, shall not apply to consequential damages for injury to the person in the case of telephones used or bought for use primarily for personal, family or household purposes.

This warranty sets forth the entire liability and obligations of Nortel Networks with respect to breach of warranty, and the warranties set forth or limited herein are the sole warranties and are in lieu of all other warranties, expressed or implied, including warranties or fitness for particular purpose and merchantability.

## Warranty Repair Services

Should the set fail during the warranty period:
**In North America**, please call 1-800-574-1611 for further information.
**Outside North America**, contact your sales representative for return instructions. You will be responsible for shipping charges, if any. When you return this telephone for warranty service, you must present proof of purchase.

## After Warranty Service

Nortel Networks offers ongoing repair and support for this product. This service provides repair or replacement of your Nortel Networks product, at Nortel Networks option, for a fixed charge. You are responsible for all shipping charges. For further information and shipping instructions:
**In North America**, contact our service information number: 1-800-574-1611.
**Outside North America**, contact your sales representative.

Repairs to this product may be made only by the manufacturer and its authorized agents, or by others who are legally authorized. This restriction applies during and after the warranty period. Unauthorized repair will void the warranty.

North American Regulatory Information . . . . . 2
Safety . . . . . 2
Enhanced 911 Configuration . . . . . 3
Radio-frequency Interference . . . . . 3
Telecommunication Registration . . . . . 4
Network Connection . . . . . 5
Hearing Aid Compatibility . . . . . 5
Electromagnetic Compatibility . . . . . 5
Telephone Company Registration . . . . . 5
Use of a Music Source . . . . . 6
Rights of the Telecommunications Company . . . . . 6
Repairs . . . . . 6
Canadian Regulations - please read carefully . . . . . 6
US Regulations - please read carefully . . . . . 7
Federal Communications Commission (FCC) Notice . . . . . 7
EMI/EMC (FCC Part 15) . . . . . 9
Important Safety Instructions . . . . . 9
International Regulatory Information . . . . . 11
Safety . . . . . 12
Additional Safety Information . . . . . 12
Limited Warranty . . . . . 13
Exclusions . . . . . 13
Warranty Repair Services . . . . . 14
After Warranty Service . . . . . 14
**Preface . . . . . 33**
Display Tips . . . . . 33
Symbols used in this guide . . . . . 34
Text conventions . . . . . 35
Acronyms . . . . . 35
Related publications . . . . . 37
How to Get Help . . . . . 38

**Chapter 1**
**Introduction to the Business Communications Manager Platform Hardware . 39**
Business Communications Manager Field Replaceable Units . . . . . 40
BCM200 Platform Base Hardware . . . . . 43
BCM200 platform base chassis . . . . . 43
BCM400 Platform Base Hardware . . . . . 45
BCM400 platform base chassis . . . . . 46
BCM400 standard (STD) configuration hardware components . . . . . 46
BCM400 platform redundant feature option (RFO) configuration . . . . . 48
BCM400 advanced function tray (AFT) . . . . . 49
BCM400 advanced function tray RAID status LEDs . . . . . 50

Platform Media Bay Module Bays and Backplane . . . . . 50
Base Function Tray Component Hardware . . . . . 53
Base function tray chassis . . . . . 54
Base function tray interfaces . . . . . 54
Base function tray system status display LEDs . . . . . 55
Media services card (MSC) . . . . . 56
MSC IP call processing hardware . . . . . 58
Main card . . . . . 59
Main card connections . . . . . 61
PCI riser card . . . . . 61
Data networking components . . . . . 62
WAN interface card . . . . . 62
Modem card . . . . . 64
I/O Interface card . . . . . 64
Platform Power Supply . . . . . 66
BCM400 redundant power supply . . . . . 67
Hard Disk . . . . . 68
RAID upgrade kit . . . . . 69
Cooling Fan . . . . . 70
Telephony Components . . . . . 70
Media bay modules (MBMs) . . . . . 73
Media bay module LED indicators . . . . . 74
Media bay module power connections . . . . . 74
Media bay module dip switches . . . . . 75
Trunk Media Bay Modules . . . . . 76
Digital trunk media bay module . . . . . 77
Caller ID trunk media bay module . . . . . 78
Basic rate interface (BRI) media bay module . . . . . 79
Global Analog Trunk Module (GATM) . . . . . 80
Station Media Bay Modules . . . . . 81
Digital station media bay module (DSM) . . . . . 81
4x16 media bay module . . . . . 82
Analog station media bay modules . . . . . 83
Specialized media bay modules . . . . . 86
Digital enhanced cordless telecommunications (DECT) media bay module . . . . . 87
Fiber expansion media bay module (FEM) . . . . . 89
Digital drop and insert MUX (DDIM) . . . . . 89
Telephones and adapters . . . . . 91
Portable systems . . . . . 93
Companion System Components . . . . . 93
DECT System Components . . . . . 94
T7406 system components . . . . . 94

NetVision system components . . . . . 94
Business Communications Manager Expansion Unit . . . . . 96

**Chapter 2**
**Auxilliary Requirements and Installation Process Overview. . . . . 97**

Computer Prerequisites . . . . . 98
Workstation browser requirements . . . . . 98
Preloading Java Class files on your workstation . . . . . 99
Optimizing Unified Manager speed . . . . . 99
Installation Process Overview . . . . . 100
Installation Preparation Checklist . . . . . 102
Environment Checklist . . . . . 102
Electrical Requirements . . . . . 103
Internal wiring requirements . . . . . 103
Digital loop . . . . . 103
Analog loop . . . . . 104
System Equipment and Supplies . . . . . 104
Basic hardware . . . . . 104
Optional equipment . . . . . 104
Companion equipment . . . . . 105
C3050 CT2 Plus (Canada) . . . . . 105
C3050 Etiquette (USA) . . . . . 105
Optional Companion equipment . . . . . 105
Other cordless systems . . . . . 105
DECT Equipment . . . . . 105
Equipment for installing the platform base chassis . . . . . 106

**Chapter 3**
**Install the Business Communications Manager and Expansion Unit Platform Base Chassis . . . . . 107**

Install the Platform Base Chassis in a Rack . . . . . 107
Attach the rack mounting brackets . . . . . 107
Mount the platform base chassis in an equipment rack . . . . . 109
Install the Platform Base Chassis on the Wall . . . . . 111
Install the Platform Base Chassis on a Flat Surface . . . . . 113
Install the Expansion Unit into a Rack . . . . . 113
Attach the mounting brackets to the Expansion Unit . . . . . 113
Mount the Expansion Unit to the rack . . . . . 114
Install the Expansion Unit on a Flat Surface . . . . . 115
Connect the Expansion Unit to the Business Communications Manager . . . . . 115

## Chapter 4
## Install, Remove, or Replace the Media Bay Modules . . . . . 117


Media Bay Module System Selection . . . . . 117
- Trunk media bay module selection . . . . . 118
- Station media bay module selection . . . . . 120
- Fiber expansion module selection . . . . . 121

Determine system capacity . . . . . 121
- Understand DS30 numbers . . . . . 122
- Setting offsets . . . . . 123
- Determine module channel requirements . . . . . 124

Rules for Assigning DS30 Resources . . . . . 127
- Notes about assigning modules . . . . . 127
- Choose the assigned order for modules . . . . . 128

Set Media Bay Module Dip Switches . . . . . 130
- Determine module dip switch settings . . . . . 131
- Module dip switches . . . . . 135

Assign Line and Extension Numbers for Specific Modules . . . . . 136
- DTM switch settings . . . . . 136
- DDIM switch settings . . . . . 137
- BRI switch settings . . . . . 138
- CTM switch settings . . . . . 138
- GATM switch settings . . . . . 140
- 4X16 switch settings . . . . . 141
- ASM 8 and ASM 8+ switch settings . . . . . 143
  - ASM8+ country switch settings . . . . . 144
- DSM switch settings . . . . . 144
  - DSM 16/DSM 32 single-density switch settings (upgraded system) . . . . . 145
  - DSM16+ and DSM 32+ double density switch settings (upgraded system) . . . . . 146
  - DSM16/DSM 32 single density switch settings (new system) . . . . . 147
  - DSM16+ and DSM 32+ double density switch settings (new system) . . . . . 148
- DECT switch settings . . . . . 149
- FEM switch settings . . . . . 149

Install a Media Bay Module . . . . . 150
- Shut down the system . . . . . 151
- Install a media bay module in the Business Communications Manager platform base chassis 152
- Install a media bay module in the expansion unit . . . . . 153
- Reconnect the equipment . . . . . 153

Remove a Media Bay Module . . . . . 154
- Remove a media bay module from the Business Communications Manager platform base chassis . . . . . 154
- Remove a media bay module from the expansion unit . . . . . 156

Replace a Media Bay Module . . . . . 157
Wire the Media Bay Modules . . . . . 158
Module Wiring Warnings . . . . . 160
Connect the media bay modules to service providers . . . . . 160
Wire Media Bay Modules to Internal Connections . . . . . 163
FEM Wiring . . . . . 167
Connect the fiber cables . . . . . 167
Set DNs and Port Numbers . . . . . 169
Media Bay Module Combinations . . . . . 170
Combining CTMs/GATMs and 4X16s . . . . . 170
Fully-loaded Setup . . . . . 171
DECT Combinations . . . . . 174
Changing Configurations . . . . . 175
System Setup . . . . . 175

**Chapter 5**
**Business Communications Manager System Startup . . . . . 177**

Check Power and Wiring . . . . . 178
Check system power and status . . . . . 179
Connect the Data Networking Hardware . . . . . 180
Connect the cards . . . . . 181
Connect wiring to the WAN card . . . . . 182
Connect wiring to the modem . . . . . 183
Install the cards . . . . . 185
Initialize the System . . . . . 185
Data parameter requirements . . . . . 185
Default IP settings . . . . . 185
Connecting when there is an IP address conflict . . . . . 186
Use of a null modem serial cable . . . . . 186
Null modem cable setup . . . . . 187
Display the configuration menus . . . . . 188
Ethernet crossover cable usage . . . . . 190
Set the crossover connections . . . . . 190
Configure your computer . . . . . 190
Connect the Ethernet crossover cable . . . . . 191
Enter the software keycodes . . . . . 191
Regenerating keycodes after system replacement . . . . . 192

**Chapter 6**
**Prepare Hardware for Maintenance or Upgrades . . . . . 193**

Precautions . . . . . 193
Special Tools . . . . . 195

Controlled System Shutdown . . . . . 195
Shut down the system software . . . . . 195
Shut down the system hardware . . . . . 196
Restart the System after Maintenance . . . . . 197
Restore the System to Operation . . . . . 197
Software Restart . . . . . 197
Base Function Tray Maintenance Procedures . . . . . 198
Remove the base function tray . . . . . 200
Install the base function tray . . . . . 201
Remove the base function tray bezel . . . . . 203
Install the base function tray bezel . . . . . 204
Advanced Function Tray Maintenance Procedures . . . . . 206
Remove the advanced function tray . . . . . 207
Install the advanced function tray . . . . . 209
Remove and Install the Platform Base Chassis Top Cover . . . . . 211
Remove the platform base chassis top cover . . . . . 211
Install the platform base chassis top cover . . . . . 213
Use the Backup and Restore Utility . . . . . 215

**Chapter 7**
**Hard Disk Replacement Procedures . . . . . 217**

Install a RAID System . . . . . 219
Replace a RAID configuration hard disk . . . . . 220
Remove a Hard Disk Cage . . . . . 221
Remove a hard disk cage from a BCM200 platform base chassis . . . . . 222
Remove a hard disk cage from a BCM400 AFT chassis . . . . . 223
Install a Hard Disk Cage . . . . . 225
Install a hard disk cage in a BCM200 platform base chassis . . . . . 225
Install a hard disk cage in a BCM400 platform base chassis . . . . . 227
Replace a Hard Disk in the Hard Disk Cage . . . . . 228
Remove a hard disk from a standard configuration hard disk cage . . . . . 229
Remove a primary hard disk from a RAID hard disk cage . . . . . 230
Remove a mirror hard disk from a RAID hard disk cage . . . . . 231
Install a hard disk into a standard configuration hard disk cage . . . . . 232
Install a primary hard disk into a RAID hard disk cage . . . . . 233
Install a mirror hard disk into a RAID hard disk cage . . . . . 234
Initialize the Hard Disk . . . . . 236

**Chapter 8**
**Install or Replace a Cooling Fan. . . . . 243**

Cooling Fan Replacement Process . . . . . 244
Remove a BCM400 cooling fan . . . . . 244

Install a BCM400 cooling fan . . . . . 247
Remove a BCM200 cooling fan . . . . . 249
Install the BCM200 cooling fan . . . . . 251
Remove an expansion unit fan . . . . . 252
Install an expansion unit fan . . . . . 254
Troubleshooting Fans . . . . . 256

**Chapter 9**
**Replace or Upgrade a Power Supply . . . . . 257**

Replace a Standard Power Supply . . . . . 258
Remove a BCM200 standard power supply . . . . . 258
Install a BCM200 standard power supply . . . . . 261
Remove a BCM400 standard power supply . . . . . 265
Install a BCM400 standard power supply . . . . . 267
Upgrade to a redundant power supply . . . . . 270
Remove the PSU status connector jumper . . . . . 271
Install a redundant power supply cage . . . . . 272
Remove a BCM400 redundant power supply cage . . . . . 277
Install a power supply module . . . . . 279
Remove a power supply module . . . . . 281

**Chapter 10**
**Replace Data Cards and Processing Hardware . . . . . 283**

System status LEDs . . . . . 283
Card Replacement Procedures . . . . . 283
Remove the WAN card . . . . . 285
Install the WAN card . . . . . 287
Initialize a new WAN card . . . . . 289
Remove the media services card (MSC) . . . . . 292
Install the media services card (MSC) . . . . . 294
Remove the modem card . . . . . 297
Install the modem card . . . . . 300
Replace the Processor Expansion Card (PEC) . . . . . 303
Remove the processor expansion card (PEC) . . . . . 304
Install a processor expansion card (PEC) . . . . . 306
Replace Memory . . . . . 308
Remove the dual in-line memory module (DIMM) card . . . . . 308
Install the dual in-line memory module (DIMM) card . . . . . 310
Replace the Clock/Calendar Battery . . . . . 312
Remove the clock/calendar battery . . . . . 313
Install a new clock/calendar battery . . . . . 314

**Chapter 11**
**Install Telephones and Peripherals . . . . . 317**

System Telephones . . . . . 317
Analog terminal adapter . . . . . 318
Central Answering Position (CAP/eCAP) . . . . . 318
Telephone port and DN cross-reference . . . . . 319
Emergency Telephone Installation . . . . . 321
Install IP Telephones . . . . . 322
Install Radio-Based Portable Systems . . . . . 322
Companion portable system . . . . . 322
DECT Systems . . . . . 323
T7406 cordless systems . . . . . 324
Move Telephones . . . . . 324

**Chapter 12**
**Install Companion or DECT Systems. . . . . 325**

The Companion Wireless System . . . . . 325
Companion components . . . . . 326
Companion Hardware Installation . . . . . 327
Install the base station remote power interconnect (RPI) unit . . . . . 327
Mount the RPI unit . . . . . 329
RPI wiring and connections . . . . . 332
Install a Companion base station . . . . . 338
Position the Companion base station . . . . . 338
Attach a Companion Base Station to a wall or ceiling . . . . . 339
Companion set registration . . . . . 341
System restart . . . . . 341
Install an external antenna and lightning surge protection . . . . . 342
Read before you install equipment . . . . . 342
Antenna installation (United States of America) . . . . . 342
Install a lightning surge protector (USA) . . . . . 344
Install an antenna (Canada) . . . . . 346
Install DECT Systems . . . . . 352

**Chapter 13**
**Install Analog Terminal Adapters (ATA) . . . . . 355**

Prepare for Installation . . . . . 355
Environmental requirements . . . . . 355
Operating requirements . . . . . 356
Analog transmission parameters . . . . . 356
(North American systems only) . . . . . 356
Measure insertion loss . . . . . 357

Measure insertion loss between the central office and analog device . . . . . 357
Measure insertion loss from the analog device to central office . . . . . 358
Connect the ATA 2 . . . . . 359
Mount, Configure, and Test the BCM ATA 2 . . . . . 360
Mount the ATA 2 . . . . . 360
Determine the ATA 2 extension number . . . . . 361
Configure the ATA 2 . . . . . 362
Test the ATA 2 . . . . . 362
ATA 2 Data Communication . . . . . 363
Data transmission requirements . . . . . 363
FAX and modem transmission compatibility . . . . . 363
Install a Data Communication Device . . . . . 364

**Chapter 14**
**Install Optional Telephony Equipment . . . . . 365**

Media Service Card Connections . . . . . 365
Install an auxiliary ringer . . . . . 365
Activate auxiliary ringer programming . . . . . 366
Connect the external paging system . . . . . 366
Connect an external music source . . . . . 368
Music on hold specifications . . . . . 368

**Chapter 15**
**System Monitoring and Troubleshooting . . . . . 369**

System Status Display LEDs . . . . . 370
Power status (LED 1) . . . . . 372
Hard disk activity (LED 2) . . . . . 372
System status (LED 3) . . . . . 372
PCI devices (LEDs 4-8) . . . . . 373
Chassis/CPU temperature (LED 9) . . . . . 373
Monitor System Status Through the Unified Manager . . . . . 373
Monitor standard configuration hard disk status through the Unified Manager . . . . . 374
Monitor the RAID LEDs . . . . . 375
Monitor Media Bay Module LEDs . . . . . 377
RAID Disk Mirroring . . . . . 378
Monitor or Configure Disk Mirror Settings Through the Unified Manager . . . . . 379
Access disk mirroring through the Unified Manager . . . . . 379
Monitor RAID disk mirror operational status through the Unified Manager . . . . . 381
Access the RAID status report through the Unified Manager . . . . . 382
Monitor disk mirroring using Unified Manager . . . . . 383
Monitor or Configure Disk Mirror Settings Through PuTTy or Telnet . . . . . 384
Access disk mirroring through PuTTy or Telnet . . . . . 385

Review or change disk mirror operation mode through PuTTY or Telnet . . . . . 388
Change beep timing through PuTTy or Telnet . . . . . 389
Change buzzer mode through PuTTy or Telnet . . . . . 390
Monitor or change UDMA mode using PuTTY or Telnet . . . . . 390
Monitor disk mirroring using PuTTy or Telnet . . . . . 391
Review mirror drive status using PuTTy or Telnet . . . . . 393
Reset to default disk mirror settings using PuTTy or Telnet . . . . . 394
Business Communications Manager does not Function . . . . . 395
Emergency Telephone Does Not Function . . . . . 395
ATA 2 Does Not Function . . . . . 395
Check the ATA 2 wiring . . . . . 396
Check for dial tone at the ATA 2 . . . . . 396
Check for trunk line dial tone to the ATA 2 . . . . . 396

397
**System Region Attributes . . . . . 397**

Regional Default System Values . . . . . 397
Regional core software . . . . . 398
Regional language default values . . . . . 398
Regional caller ID display formats . . . . . 399
Regional companding law . . . . . 400
Regional mobility services . . . . . 400
Regional media bay module availability . . . . . 401
Regional FEM-trunk module combinations . . . . . 402
Regional PRI line protocol support . . . . . 403
ISDN Line Services . . . . . 404
Define Time Zones by Country and Language . . . . . 405
System Defaults . . . . . 406
Dialing plan defaults . . . . . 408
BRI and PRI line types . . . . . 410
CallPilot regions . . . . . 412

415
**System Options . . . . . 415**

Telephony Features and Options . . . . . 415
Data Features . . . . . 418
**Glossary . . . . . 421**
**Index . . . . . 437**

# Figures


Figure 1 Acrobat Reader display setup selections . . . . . 34
Figure 2 Business Communications Manager core system components overview . . . . . 39
Figure 3 BCM200 platform base chassis and primary components . . . . . 43
Figure 4 BCM200 platform base chassis . . . . . 44
Figure 5 BCM400 platform base chassis and primary components . . . . . 46
Figure 6 BCM400 platform base chassis (standard configuration) . . . . . 47
Figure 7 BCM400 platform base chassis (RFO configuration) . . . . . 48
Figure 8 Advanced function tray . . . . . 49
Figure 9 Advanced function tray RAID status LEDs . . . . . 50
Figure 10 Media bay module filler blanking plate . . . . . 50
Figure 11 BCM200 media bay module bays . . . . . 51
Figure 12 BCM400 Media bay module bays . . . . . 51
Figure 13 BCM200 media bay module backplane . . . . . 52
Figure 14 BCM400 media bay module backplane . . . . . 52
Figure 15 Base function tray hardware and chassis . . . . . 54
Figure 16 Base function tray faceplate ports . . . . . 55
Figure 17 Business communication manager base function tray system status display LEDs 56
Figure 18 BCM200 media services card . . . . . 57
Figure 19 BCM400 media services card . . . . . 57
Figure 20 Main card connectors . . . . . 60
Figure 21 Card connections . . . . . 61
Figure 22 PCI Riser card . . . . . 62
Figure 23 PCI Riser card connectors . . . . . 62
Figure 24 WAN interface card (international version) . . . . . 63
Figure 25 Dual V.35 WAN interface card . . . . . 63
Figure 26 WAN interface card (North American version) . . . . . 63
Figure 27 Modem card and interface . . . . . 64
Figure 28 I/O interface card . . . . . 65
Figure 29 BCM200 and BCM400 (STD) platform power supply (rear view) . . . . . 66
Figure 30 Standard power supply connectors . . . . . 66
Figure 31 BCM400 platform redundant power supply and modules . . . . . 67
Figure 32 BCM400 Redundant power supply connectors . . . . . 67
Figure 33 BCM200 standard hard disk and cage . . . . . 68
Figure 34 BCM400 standard hard disk and cage . . . . . 68
Figure 35 BCM200/400 2xHDD + RAID controller . . . . . 69
Figure 36 Cooling fan . . . . . 70
Figure 37 Telephony hardware components. . . . . 72
Figure 38 Module Power and Status LED states . . . . . 74
Figure 39 Rear of modules showing DS256 channel and power connectors . . . . . 74
Figure 40 dip switch positions on the modules . . . . . 75

Figure 41 Digital Trunk Interface Module (DTM) faceplate LEDs and connectors . . . . . 77
Figure 42 CTM4 and CTM8 module faceplate LEDS and connectors . . . . . 79
Figure 43 BRIM S/T module faceplate LEDs and connectors . . . . . 79
Figure 44 GATM module faceplate LEDs and connectors . . . . . 80
Figure 45 DSM 16+ and DSM 32+ module faceplate LEDs and connectors . . . . . 82
Figure 46 4X16 module faceplate LEDS and connectors . . . . . 83
Figure 47 ASM 8 module faceplate LEDs and connectors . . . . . 85
Figure 48 DECT module faceplate LEDs and connectors . . . . . 88
Figure 49 Fiber expansion module (FEM) faceplate LEDs and connectors . . . . . 89
Figure 50 Digital drop and insert (DDIM) faceplate LEDs and connectors . . . . . 90
Figure 51 Business communication manager DS256 connectors and expansion unit . . . . 96
Figure 52 Installation and initialization overview . . . . . 100
Figure 53 Attach the rack mount bracket to the BCM200 chassis . . . . . 108
Figure 54 Attach the rack mount bracket to the BCM400 chassis . . . . . 108
Figure 55 Fasten the BCM200 platform base chassis to an equipment rack . . . . . 109
Figure 56 Fasten the BCM400 platform base chassis to an equipment rack . . . . . 110
Figure 57 Attach the wall-mount brackets to the BCM200 platform base chassis . . . . . 112
Figure 58 Attach the wall-mount brackets to the BCM400 platform base chassis . . . . . 112
Figure 59 Attach the rack mounting bracket to the expansion unit . . . . . 114
Figure 60 Fasten the expansion unit to the equipment rack . . . . . 115
Figure 61 DS256 connector on the expansion unit . . . . . 116
Figure 62 Business Communications Manager DS256 connector . . . . . 116
Figure 63 Process for determining modules . . . . . 118
Figure 64 DS30 model . . . . . 122
Figure 65 Offsets are part of DS30 channel line groups . . . . . 124
Figure 66 Space requirements for media bay modules, on a per-DS30 configuration . . . 125
Figure 67 Space requirements for special media bay modules . . . . . 126
Figure 68 Assigning single-density modules to the DS30 channel hierarchy . . . . . 129
Figure 69 Assigning double density modules to the DS30 channel hierarchy . . . . . 130
Figure 70 How to use the configuration map . . . . . 132
Figure 71 Switches on the media bay module . . . . . 135
Figure 72 Overview of installing a media bay module . . . . . 151
Figure 73 Overview of removing a media bay module . . . . . 154
Figure 74 Remove a BCM200 media bay module . . . . . 155
Figure 75 Remove a BCM400 media bay module . . . . . 155
Figure 76 Remove the expansion unit front bezel . . . . . 156
Figure 77 Overview of module replacement process . . . . . 157
Figure 78 Trunk and station wiring overview . . . . . 159
Figure 79 DTM RJ48C wiring array . . . . . 160
Figure 80 CTM RJ11 wiring array . . . . . 161
Figure 81 BRIM S/T RJ45 wiring array . . . . . 162
Figure 82 GATM pinouts . . . . . 163

Figure 83 Wiring for DSM 16/16+, 4X16, DSM 32/32+ . . . . . 165
Figure 84 Wiring for an ASM 8 or ASM 8+ . . . . . 166
Figure 85 Module power and status LEDs . . . . . 179
Figure 86 Base function tray data cards . . . . . 181
Figure 87 Serial pinout . . . . . 187
Figure 88 Configuration main menu screen . . . . . 189
Figure 89 Ethernet crossover cable . . . . . 190
Figure 90 Prepare for maintenance overview . . . . . 194
Figure 91 Base function tray replacement overview . . . . . 199
Figure 92 Remove the base function tray . . . . . 201
Figure 93 Install the base function tray . . . . . 202
Figure 94 Remove the base function tray bezel . . . . . 204
Figure 95 Install the base function tray bezel . . . . . 205
Figure 96 Advanced function tray . . . . . 206
Figure 97 Advanced function tray replacement overview . . . . . 207
Figure 98 Remove the advanced function tray . . . . . 208
Figure 99 Install the advanced function tray . . . . . 210
Figure 100 Remove the BCM200 top cover . . . . . 212
Figure 101 Remove the BCM400 top cover . . . . . 212
Figure 102 Install the BCM200 top cover . . . . . 213
Figure 103 Install the BCM400 top cover . . . . . 214
Figure 104 Hard disk replacement overview . . . . . 218
Figure 105 Detach the hard disk cage from the BCM200 platform base chassis . . . . . 223
Figure 106 Detach the hard disk cage from the BCM400 advanced function tray chassis 224
Figure 107 Insert the hard disk cage into the BCM200 platform base chassis . . . . . 226
Figure 108 Insert the hard disk cage to the BCM400 advanced function tray chassis . . . . 227
Figure 109 Remove the hard disk from the standard hard disk cage . . . . . 229
Figure 110 Remove the primary hard disk from the RAID hard disk cage . . . . . 230
Figure 111 Remove the mirror hard disk from the RAID hard disk cage . . . . . 231
Figure 112 Install a single hard disk in the standard configuration hard disk cage . . . . . 232
Figure 113 Install a primary hard disk into the RAID hard disk cage . . . . . 234
Figure 114 Install a mirror hard disk into the RAID hard disk cage . . . . . 235
Figure 115 Main menu . . . . . 237
Figure 116 Platform initialization menu . . . . . 237
Figure 117 Initialize Menu screen . . . . . 238
Figure 118 Region Initialization Menu . . . . . 239
Figure 119 Select option 2 - Main menu screen . . . . . 239
Figure 120 System configuration start page . . . . . 240
Figure 121 Quick start page . . . . . 240
Figure 122 Chassis cooling fan replacement overview . . . . . 244
Figure 123 Remove the BCM400 fan access panel . . . . . 245
Figure 124 Disconnect the fan cable from the I/O card . . . . . 246
Figure 125 Remove the snap rivets from the BCM400 fan access panel . . . . . 246

Figure 126 Fan chassis mounting holes . . . . . 247
Figure 127 Insert the snap rivets into the BCM400 fan access panel . . . . . 248
Figure 128 Connect the fan cable(s) to the I/O card . . . . . 248
Figure 129 Install the fan access panel to the platform base chassis . . . . . 249
Figure 130 Disconnect the BCM200 fan cable from the I/O card . . . . . 250
Figure 131 Remove the snap rivets from the BCM200 platform base chassis . . . . . 251
Figure 132 Insert the snap rivets into the BCM200 platform base chassis . . . . . 252
Figure 133 Fan screws location in expansion unit, 2.0 models. . . . . 253
Figure 134 Fan screws location in expansion unit, 2.5 redundancy models. . . . . 254
Figure 135 Standard power supply replacement overview . . . . . 258
Figure 136 Remove the BCM200 MSC guide bracket . . . . . 259
Figure 137 Remove the I/O card from the BCM200 platform base chassis . . . . . 260
Figure 138 Remove the BCM200 power supply chassis screws . . . . . 260
Figure 139 Install the BCM200 power supply chassis screws . . . . . 261
Figure 140 Power and hard disk cable routing . . . . . 262
Figure 141 Install the I/O card in the BCM200 platform base chassis . . . . . 262
Figure 142 Install the BCM200 MSC guide bracket . . . . . 263
Figure 143 Tie-wrap excess P1 power cable length . . . . . 263
Figure 144 Remove the BCM400 power supply chassis screws . . . . . 266
Figure 145 Remove the power supply and support bracket . . . . . 266
Figure 146 Fasten the power supply support bracket cables . . . . . 267
Figure 147 Fasten the power supply support bracket to the platform base chassis . . . . . 268
Figure 148 Fasten the standard power supply to the platform base chassis . . . . . 268
Figure 149 Redundant power supply upgrade overview . . . . . 270
Figure 150 Remove the PSU status connector jumper . . . . . 272
Figure 151 Remove the BCM400 power supply adapter tab from the support bracket . . . 273
Figure 152 Remove the power supply knockout bracket . . . . . 273
Figure 153 Fasten the power supply support bracket cables . . . . . 274
Figure 154 Attach the redundant power supply cage . . . . . 275
Figure 155 Install a new cable clamp . . . . . 275
Figure 156 Install a cable grommet . . . . . 276
Figure 157 Remove the BCM400 redundant power supply chassis screws . . . . . 278
Figure 158 Remove the redundant power supply cage and support bracket . . . . . 279
Figure 159 Install the power supply modules into the power supply cage . . . . . 280
Figure 160 BCM400 platform redundant power supply (rear view) . . . . . 280
Figure 161 Remove the power supply module from the power supply cage . . . . . 282
Figure 162 Base function tray interior components . . . . . 284
Figure 163 Card replacement overview . . . . . 285
Figure 164 Remove the WAN card and PCI cover plate . . . . . 286
Figure 165 Install the WAN card . . . . . 287
Figure 166 Configuration main menu . . . . . 290
Figure 167 Platform initialization menu . . . . . 290

Figure 168 Initialize menu . . . 291
Figure 169 MSC chassis mounting screws . . . 293
Figure 170 Configuration main menu screen . . . 295
Figure 171 Platform Initialization Menu screen . . . 296
Figure 172 MSC Upload (Initialization) menu screen . . . 296
Figure 173 Modem card . . . 298
Figure 174 Modem card . . . 299
Figure 175 Modem port label . . . 301
Figure 176 Modem card guide pin installation . . . 301
Figure 177 PEC replacement overview . . . 303
Figure 178 Remove the processor expansion card (PEC III) . . . 305
Figure 179 Insert the processor expansion card (PEC III) . . . 307
Figure 180 Memory replacement overview . . . 308
Figure 181 Remove and replace the dual in-line memory module . . . 310
Figure 182 Battery replacement overview . . . 312
Figure 183 Removing the clock/calendar battery . . . 314
Figure 184 Overview of installing a Companion system . . . 326
Figure 185 RPI unit . . . 328
Figure 186 RPI mounting holes . . . 329
Figure 187 Open the RPI cover . . . 330
Figure 188 RPI components . . . 331
Figure 189 RPI connector printed-circuit board . . . 332
Figure 190 Output connector pinout . . . 333
Figure 191 Input connector pinout . . . 334
Figure 192 Bracket termination board . . . 339
Figure 193 Slide the cover on bracket . . . 340
Figure 194 Installed antenna and lightning surge protectors (USA) . . . 343
Figure 195 Antenna with antenna bracket (USA) . . . 344
Figure 196 Lightning surge protector and bracket (USA) . . . 345
Figure 197 Indoor directional external antenna (Canada) . . . 347
Figure 198 Indoor omnidirectional external antenna (Canada) . . . 348
Figure 199 Install the outdoor omnidirectional external antenna (Canada) . . . 350
Figure 200 Install the lightning surge protector (Canada) . . . 351
Figure 201 R451 connectors on the DECT media bay module . . . 353
Figure 202 Insertion Loss from the CO to the analog telephone . . . 357
Figure 203 Analog telephone installation overview . . . 359
Figure 204 ATA 2 pin outs . . . 359
Figure 205 ATA 2 top view . . . 360
Figure 206 ATA 2 back view . . . 361
Figure 207 Data communication device installation overview . . . 364
Figure 208 Auxiliary ringer jack . . . 366
Figure 209 Audio input jack . . . 367
Figure 210 Page relay jack . . . 367

Figure 211 Music on hold jack . . . . . 368
Figure 212 SSD board connections . . . . . 370
Figure 213 LED locations on the face of the base function tray . . . . . 371
Figure 214 System Status Monitor LED Settings record . . . . . 374
Figure 215 System Status Monitor LED display screen . . . . . 375
Figure 216 Advanced function tray RAID status LEDs . . . . . 376
Figure 217 Disk mirror settings screen . . . . . 380
Figure 218 Disk mirroring status display screen . . . . . 381
Figure 219 View status report screen . . . . . 383
Figure 220 Drive status report screen . . . . . 384
Figure 221 Main Menu screen . . . . . 386
Figure 222 System status monitor screen . . . . . 387
Figure 223 Mirror disk menu screen . . . . . 387
Figure 224 Mirror operation menu screen . . . . . 388
Figure 225 Mirror beep timing menu screen . . . . . 389
Figure 226 Buzzer mode menu screen . . . . . 390
Figure 227 Mirror UDMA menu screen . . . . . 391
Figure 228 Duplidisk status screen . . . . . 392
Figure 229 Mirror drive status menu screen . . . . . 393
Figure 230 Mirror drive status menu screen . . . . . 394

# Tables


Table 1 Interface harmonized standards . . . . . 5
Table 2 Card field replaceable units . . . . . 40
Table 3 Chassis field replaceable units . . . . . 41
Table 4 Hard drive field replaceable units . . . . . 41
Table 5 Power supply field replaceable units . . . . . 41
Table 6 Cooling fan field replaceable units . . . . . 42
Table 7 Media bay module . . . . . 42
Table 8 Media bay module list . . . . . 73
Table 9 Trunk media bay modules . . . . . 76
Table 10 DTM LED functions . . . . . 77
Table 11 Station module regional availability . . . . . 81
Table 12 ASM 8 and ASM 8+ analog device specifications . . . . . 85
Table 13 Specialized modules . . . . . 86
Table 14 Determining trunk module requirements . . . . . 119
Table 15 Station media bay modules required . . . . . 120
Table 16 Matching modules to DS30 channel capacity . . . . . 126
Table 17 Possible trunk media bay module dip switch settings . . . . . 133
Table 18 Possible station media bay module dip switch settings . . . . . 134
Table 19 DTM switch settings (T1) . . . . . 136
Table 20 DTM switch settings (North American PRI) . . . . . 136
Table 21 DTM switch settings (E1 and UK PRI) . . . . . 137
Table 22 DDIM switch settings . . . . . 137
Table 23 BRIM S/T switch settings . . . . . 138
Table 24 CTM and CTM8 switch settings . . . . . 139
Table 25 4x16 switch settings . . . . . 142
Table 26 ASM 8 settings . . . . . 143
Table 27 ASM8+ country select dip switch settings . . . . . 144
Table 28 DSM 16/DSM 16+ and DSM 32/DSM 32+ single-density switch settings (upgraded system) 146
Table 29 DSM 16+ and DSM32+ double density switch settings (upgraded system) . . . 146
Table 30 DSM 16/DSM 16+ and DSM 32/DSM32+ single density switch settings (new system) 147
Table 31 DSM 16+ and DSM32+ double density switch settings (new system) . . . . . 148
Table 32 DECT module settings . . . . . 149
Table 33 FEM switch settings . . . . . 150
Table 34 DSM wiring chart . . . . . 165
Table 35 ASM wiring chart . . . . . 166
Table 36 Extension comparison chart . . . . . 168
Table 37 Cross referencing ports and DNs . . . . . 169
Table 38 CTMs/GATMs combined with 4X16 modules . . . . . 170
Table 39 DSM combined with 2 DTMs and 2 ASMs . . . . . 171

Table 40 All station modules set for double density . . . . . 172
Table 41 Two double density DSMs, plus a single-density DSM for Companion . . . . . 173
Table 42 Three BRI modules, two DSM 32s and 1 DECT module . . . . . 174
Table 43 Module power and status LED states . . . . . 180
Table 44 DB25 adapter cable . . . . . 182
Table 45 RS-422/EIA 530 adapter cable . . . . . 183
Table 46 V.35 Adapter Cable . . . . . 184
Table 47 DB15 X.21 adapter cable . . . . . 184
Table 48 Serial port pinout . . . . . 187
Table 49 Fan and temperature LEDs on the base function tray . . . . . 256
Table 50 Power supply LED . . . . . 264
Table 51 Cross-referencing ports and DNs on a 2.5 system upgraded to 3.0 or newer software 319
Table 52 Cross referencing ports and DNs on a new version 3.0 or newer system . . . . 320
Table 53 RPI Requirements . . . . . 328
Table 54 Cable distances . . . . . 332
Table 55 Input wiring . . . . . 334
Table 56 RPI-8 BIX wiring chart . . . . . 335
Table 57 RPI-16 BIX wiring chart . . . . . 336
Table 58 Minimum distance between office areas and base stations . . . . . 339
Table 59 Clearance for the base stations . . . . . 339
Table 60 UTAM messages . . . . . 341
Table 61 Business Communications Manager LED states . . . . . 371
Table 62 Fan and temperature LEDs on the base function tray . . . . . 373
Table 63 LED Display screen settings . . . . . 374
Table 64 Core software defined by region and carrier profile . . . . . 398
Table 65 Default languages by region . . . . . 398
Table 66 South/Central America language support . . . . . 399
Table 67 Companding law by region . . . . . 400
Table 68 Mobility services by region . . . . . 400
Table 69 Module availability, by profile . . . . . 401
Table 70 Trunk availability, by region . . . . . 402
Table 71 PRI line protocol supported, by region . . . . . 403
Table 72 ISDN line services . . . . . 404
Table 73 ISDN services by Protocol . . . . . 404
Table 74 Time/date formats based on language . . . . . 405
Table 75 Region defaults . . . . . 406
Table 76 Default dialing restrictions, by profile . . . . . 408
Table 77 BRI and PRI line types (DTM and BRI modules) . . . . . 410
Table 78 CallPilot region default languages by country . . . . . 412
Table 79 CallPilot feature default anomalies . . . . . 413

# Preface

This guide describes how to install, initialize, and maintain the hardware for the Business Communications Manager BCM200 and BCM400 systems.

Information in these chapters explains how to:

- set up the system hardware
- start and initialize the system hardware
- troubleshoot and maintain the hardware

To use this guide, you must:

- be a Nortel Networks installer with Business Communications Manager certification
- know basic Nortel Networks terminology

## Display Tips

You can read this publication from your computer monitor or printed hard copy. For best on-screen display results, use Adobe Acrobat Reader (TM) version 4.0 or 5.0.

If you use Adobe Acrobat Reader, version 4.0, perform the following to optimize the illustrations:

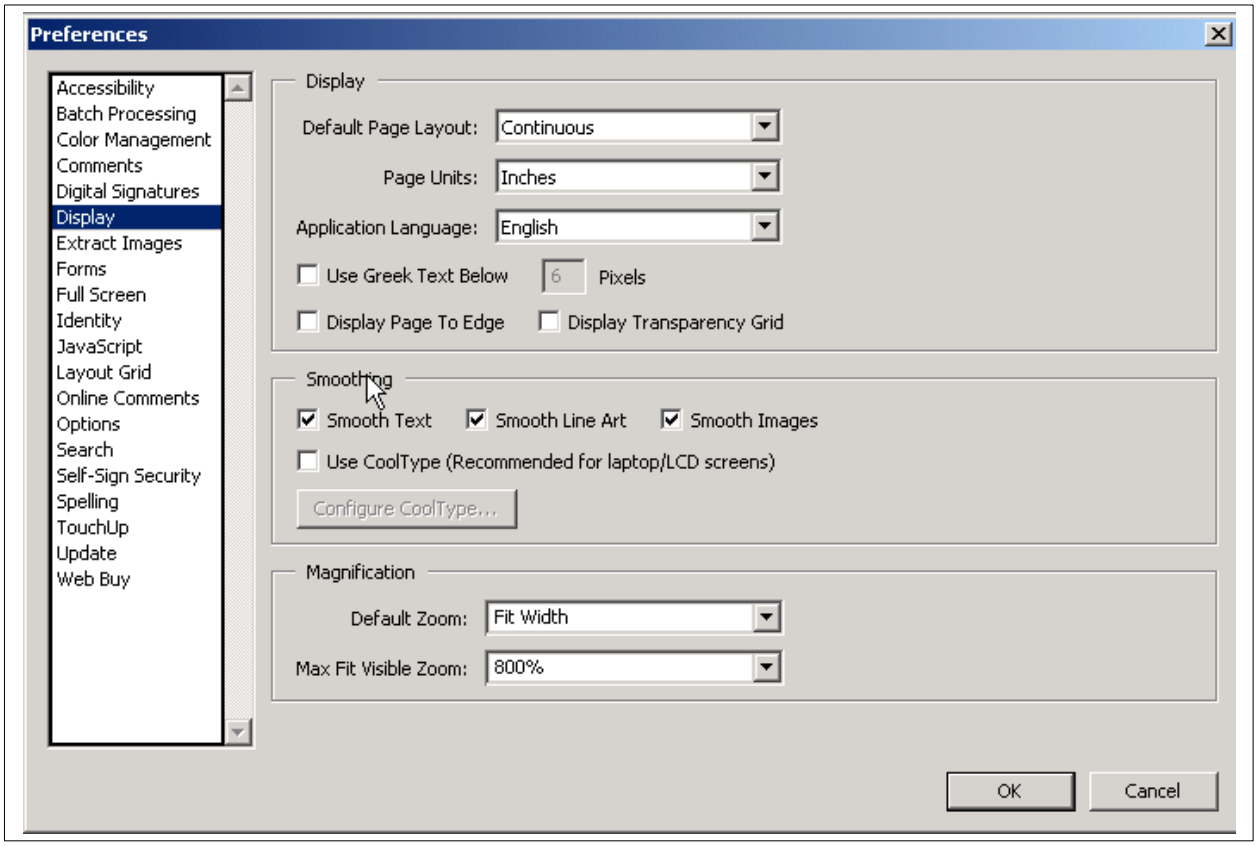
- Increase display magnification.
- Print the document.

For Adobe Acrobat Reader, version 5.0, perform the following steps to optimize the graphical display:

1. Start the Adobe Acrobat Reader, version 5.0 application.
2. From the top line menu, select **Edit** -->**Preferences** -->**General**.
3. Select **Display** from the preferences menu at the left side of the setup screen.
4. Select the following smoothing options from the Display setup screen:
   - **Smooth Text**
   - **Smooth Line Art**
   - **Smooth Images**

See Figure 1 to review Acrobat Reader version 5.0 display selections.

**Figure 1** Acrobat Reader display setup selections




# Symbols used in this guide

This guide uses the following symbols to draw your attention to important information:

**Caution:** Caution Symbol
Alerts you to conditions where you can damage the equipment.

**Danger:** Electrical Shock Hazard Symbol
Alerts you to conditions where you can get an electrical shock.

**Warning:** Warning Symbol
Alerts you to conditions where you can cause the system to work improperly or to fail.

**Note:** Note Symbol
Alerts you to important information.

**Tip:** Tip Symbol
Alerts you to additional information that can help you perform a task.

**Warning:** Grounding Symbol.
Alerts you to ground yourself with an antistatic grounding strap before performing the maintenance procedure.

**Warning:** Disconnect Symbol
Alerts you to remove the Business Communications Manager and Business Communications Manager expansion unit power cords from the AC outlet before performing any maintenance procedure.

## Text conventions

This guide uses the following text conventions:

| | |
|---|---|
| **`bold Courier text`** | Indicates command names and options and text that you need to enter in a command-line interface.<br>Example: Use the **`dinfo`** command.<br>Example: Enter **`show ip {alerts\|routes}`**. |
| *italic text* | Indicates file and directory names, new terms, book titles, Web addresses, and variables in command syntax descriptions. |
| **bold text** | Indicates command names, screen titles, options and text for a graphical user interface (GUI). |
| angle brackets (< >) | Indicates a keyboard key press or simultaneous key presses, i.e. <ENTER> or <CTRL j> |

## Acronyms

This guide uses the following acronyms (alphabetical order):

| | |
|---|---|
| ANSI | American National Standards Institute |
| ASM | Analog station media bay module |
| AWG | American wire gauge |
| BIOS | Basic input output system |
| BPS | Bits per second |
| BRI | Basic rate interface media bay module |
| CAP | Central answering position |
| CIR | Committed information rate |
| CLID | Calling line identification |

| | |
|---|---|
| CSMA/CD | Carrier sense multiple access/collision detect |
| CSU | Channel service unit |
| CTM | Calling line trunk module |
| DECT | Digital enhanced cordless telecommunications |
| DIMM | Dual in-line memory module |
| DLCI | Data link connection indentifier |
| DN | Directory number |
| DNS | Domain name server |
| DPNSS | Digital private network signalling system |
| DRT | Delayed ring transfer to prime |
| DSM | Digital station media bay module |
| DTM | Digital Trunk media bay module |
| DTMF | Dual tone multifrequency. |
| FEM | Fiber expansion media bay module |
| HTTP | Hypertext transfer protocol |
| Hz | Hertz |
| I/C | Intercom |
| IP | Internet protocol |
| ISDN | Integrated services digital network |
| Kbyte | Kilobyte |
| LAN | Local area network |
| MCDN | Meridian customer-defined network protocol |
| MHz | Megahertz |
| MSC | Media services card |
| NIC | Network interface card |
| OPX | Off premises extension |
| PBX | Private branch exchange |
| PCI | Peripheral component interconnect |
| PEC III | Processor expansion card, version III |
| PRI | Primary rate interface |
| PSTN | Public switched telephone network |
| QoS | Quality of service |
| QSIG | Q reference point signalling |
| RAM | Random access memory |
| ROM | Read only memory |
| SAPS | Station auxiliary power supply |
| TAPI | Telephony application program interface |
| TCP/IP | Transmission control protocol/internet protocol |
| UTAM | UTAM Inc. |
| VoIP | Voice over IP |
| WAN | Wide area network |

# Related publications

The following documents provide further information about the Business Communications Manager, related media bay modules, extension equipment, and system applications and software:

- *[Product Family] Programming and Operations Guide* (*P0993211)* describes core system operational configuration and how to program the Business Communications Manager equipment.
- *Telephone Features Programming Guide (P0993136)* provides feature descriptions and programming for the numerous telephone features available to users through the buttons on digital telephone sets.
- *Business Communications Manager BIX Box Wiring Guide (P0993134)* provides illustrations for correctly wiring internal cable connections to telephones.
- All optional Business Communications Manager applications have installation and user guides specific to that application. For an overview of these application user guides , refer to "Telephony Features and Options" on page 415.

| Guide type | Title | CPC code |
|---|---|---|
| CallPilot applications | CallPilot Manager Set Up and Operation Guide | P0919415 |
| | CallPilot Reference Guide | P0919417 |
| | CallPilot Fax Set up & Operation Guide | P0919426 |
| | CallPilot Fax User Guide | P0919427 |
| | CallPilot Message Networking Setup and Operation Guide | P0919429 |
| | CallPilot Message Networking User Guide | P0919430 |
| | CallPilot Programming Record | P0941757 |
| | CallPilot Unified Messaging Installation and Maintenance Guide | P0945074 |
| Call center applications | Call Center Set Up and Operation Guide | P0919436 |
| | Call Center Agent User Guide | P0919437 |
| | Call Center Supervisor User Guide | P0919438 |
| | Call Center Reporting Set Up and Operation Guide | P0919439 |
| | Multimedia Call Center Setup and Operation Guide | P0935737 |
| | Multimedia Call Center Web Developers Guide | P0935740 |
| Applications | Personal Call Manager User Guide | P0936569 |
| | Call Detail Recording System Administration Guide | P0993139 |
| Installation & Maintenance | LAN CTE Configuration Guide | P0993138 |
| | IP Telephony Configuration Guide | P0993474 |

# How to Get Help

Your local distributor provides technical support for your Business Communications Manager system or has access to that information through a Technical Service Center (TSC).

If you require non-technical support, contact 1-800-4NORTEL (1-800-466-7835), choose option 3, Sales or Pre-Sales Support)

# Chapter 1
# Introduction to the Business Communications Manager Platform Hardware

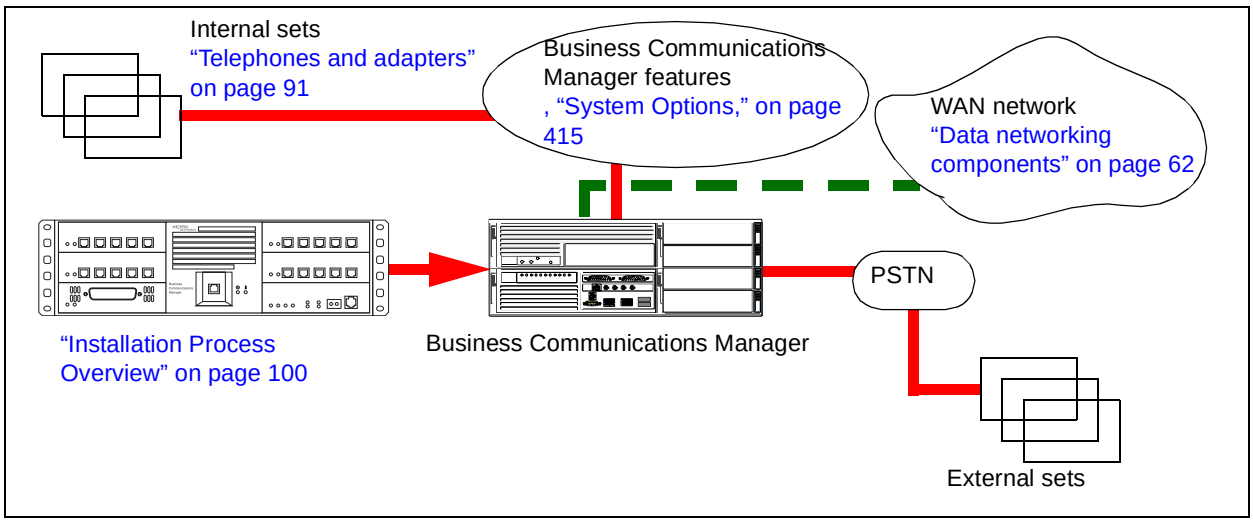
The Nortel Networks Business Communications Manager (BCM) system provides private network and telephony management capability to small and medium-sized businesses. The Business Communications Manager integrates voice and data capabilities, voice over Internet protocol (VoIP) gateway functions, and quality of service (QoS) data-routing features into a single telephony system. The Business Communications Manager is a compact system that allows you to create and provide telephony applications for use in a business environment.

This chapter contains the following main topics:


- "Business Communications Manager Field Replaceable Units" on page 40
- "BCM200 Platform Base Hardware" on page 43
- "BCM400 Platform Base Hardware" on page 45
- "Platform Media Bay Module Bays and Backplane" on page 50
- "Base Function Tray Component Hardware" on page 53
- "I/O Interface card" on page 64
- "Platform Power Supply" on page 66
- "Hard Disk" on page 68
- "Cooling Fan" on page 70
- "Telephony Components" on page 70
- "Telephones and adapters" on page 91
- "Business Communications Manager Expansion Unit" on page 96


The Business Communications Manager system includes software and hardware components that provide data networking, telephony service, voice messaging, and service applications.

**Figure 2** Business Communications Manager core system components overview


Internal sets
"Telephones and adapters" on page 91
Business Communications Manager features , "System Options," on page 415
WAN network
"Data networking components" on page 62
PSTN
"Installation Process Overview" on page 100
Business Communications Manager
External sets

The Business Communications Manager requires version 3.0 software and is available in the following three product configurations:

- BCM200
- BCM400 Standard (STD)
- BCM400 Redundant feature option (RFO)

**Note:** Some of the components described in this document are not available in all areas. Ask your Business Communications Manager sales agent for information about availability.

# Business Communications Manager Field Replaceable Units

Table 2 provides a list of field replaceable units (FRUs) for the BCM200 and BCM400 base hardware platforms. Use Table 2 to Table 7 as a reference when you need to order, replace, or install component hardware. The tables provide references to the component description and installation procedures. Note that the product engineering code (PEC) can change over time; consult the catalogue for the latest information.

**Table 2** Card field replaceable units

| Component description | FRU Description | Installation procedure |
|---|---|---|
| BCM embedded modem | Modem card on page 64 | Install the modem card on page 300 |
| Media services card | Media services card (MSC) on page 56 | Install the media services card (MSC) on page 294 |
| Media services PEC III | page 59 | Install a processor expansion card (PEC) on page 306 |
| WAN interface card with CSU/V.35 (North America only) | WAN interface card on page 62 | Install the WAN card on page 287 |
| Dual V.35 WAN interface card | WAN interface card on page 62 | Install the WAN card on page 287 |
| WAN interface card with CSU/V.35/ X.21 (International only) | WAN interface card on page 62 | Install the WAN card on page 287 |
| 256MB memory module | Main card on page 59 | Install the dual in-line memory module (DIMM) card on page 310 |

**Table 3** Chassis field replaceable units

| Component description | FRU Description | Installation procedure |
|---|---|---|
| Base function tray | Base Function Tray Component Hardware on page 53 | Install the base function tray on page 201 |
| Wall mount kit | | Install the Platform Base Chassis on the Wall on page 111 |
| BCM Field redundancy upgrade kit | BCM400 platform redundant feature option (RFO) configuration on page 48 | • Upgrade to a redundant power supply on page 270<br>• Hard Disk Replacement Procedures on page 217<br>• Install or Replace a Cooling Fan on page 243 |

**Table 4** Hard drive field replaceable units

| Component description | FRU description | Installation procedure |
|---|---|---|
| BCM 3.0 hard drive, Programmed (20GB) | Hard Disk on page 68 | Chapter 7, “Hard Disk Replacement Procedures’ |
| BCM RAID upgrade kit | RAID upgrade kit on page 69 | Hard Disk Replacement Procedures on page 217 |
| BCM replacement blank hard drive | Hard Disk on page 68 | Hard Disk Replacement Procedures on page 217 |

**Table 5** Power supply field replaceable units

| Component description | FRU Description | Installation procedure |
|---|---|---|
| BCM Universal power supply | Platform Power Supply on page 66 | Replace a Standard Power Supply on page 258 |
| BCM400 redundant power supply module (single) | BCM400 redundant power supply on page 67 | Upgrade to a redundant power supply on page 270 |

**Table 6** Cooling fan field replaceable units

| Component description | FRU Description | Installation procedure |
|---|---|---|
| BCM2.5/BCM400 Cooling fan (4-wire base unit) | Cooling Fan on page 70 | Install a BCM400 cooling fan on page 247 |
| BCM Expansion Unit Cooling Fan FRU | Cooling Fan on page 70 | Install an expansion unit fan on page 254 |
| BCM200 Chassis cooling fan | Cooling Fan on page 70 | Install the BCM200 cooling fan on page 251 |

**Table 7** Media bay module

| Component description | FRU Description | Installation procedure |
|---|---|---|
| BCM MBM Bay Filler Blanking Plate FRU | BCM MBM Metal filler | Install a Media Bay Module on page 150 |
| DTM MBM | Digital trunk media bay module on page 77 | Install a Media Bay Module on page 150 |
| CTM4 - CLID Trunk MBM | Caller ID trunk media bay module on page 78 | Install a Media Bay Module on page 150 |
| CTM8-CLID MBM | Caller ID trunk media bay module on page 78 | Install a Media Bay Module on page 150 |
| BRI S/T MBM | Basic rate interface (BRI) media bay module on page 79 | Install a Media Bay Module on page 150 |
| DSM-16+ MBM | Digital station media bay module (DSM) on page 81 | Install a Media Bay Module on page 150 |
| DSM-32+ MBM | Digital station media bay module (DSM) on page 81 | Install a Media Bay Module on page 150 |
| CMB4X16 MBM | 4x16 media bay module on page 82 | Install a Media Bay Module on page 150 |
| ASM 8 MBM | Analog station media bay modules on page 83 | Install a Media Bay Module on page 150 |
| ASM 8+ MBM | Analog station media bay modules on page 83 | Install a Media Bay Module on page 150 |
| FEM 6 MBM | Fiber expansion media bay module (FEM) on page 89 | Install a Media Bay Module on page 150 |
| DDIM MBM | Digital drop and insert MUX (DDIM) on page 89 | Install a Media Bay Module on page 150 |
| GATM MBM | Global Analog Trunk Module (GATM) on page 80 | Install a Media Bay Module on page 150 |

# BCM200 Platform Base Hardware

This section provides a description of the BCM200 platform base hardware and chassis components. This section provides the following information:

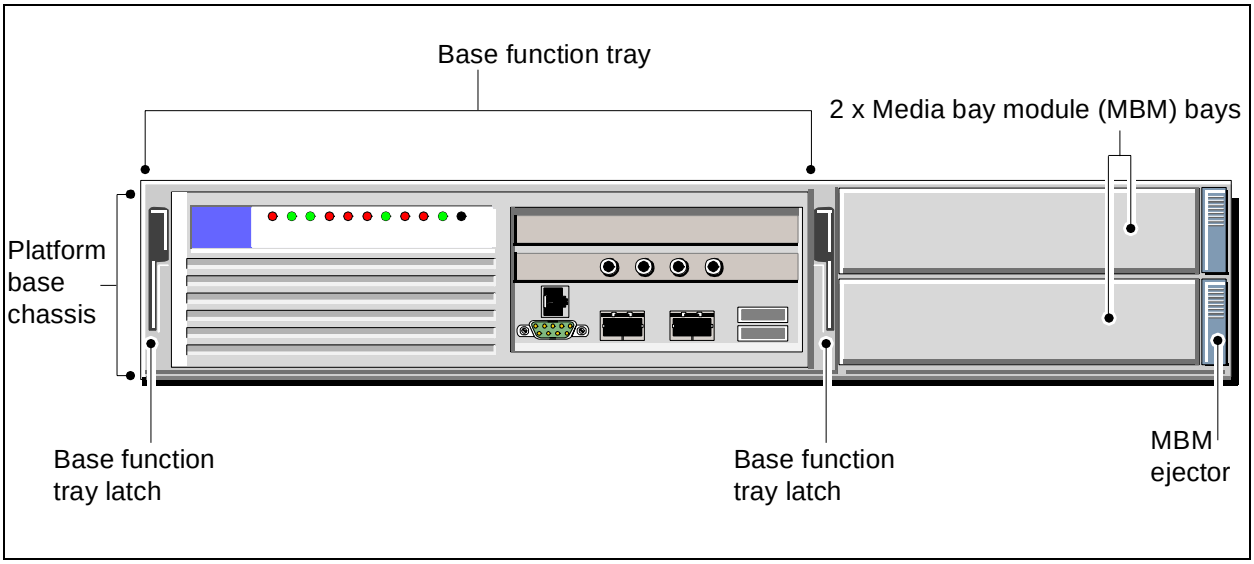
"BCM200 platform base chassis" on page 43

The BCM200 platform base hardware has the following primary components:

- 1 x platform base chassis (see "BCM200 platform base chassis" on page 43)
- 2 x media bay module bays (MBM) (see "Media bay modules (MBMs)" on page 73)
- 1 x sliding base function tray (BFT) (see "Base Function Tray Component Hardware" on page 53)

Figure 3 illustrates the BCM200 configuration primary components. The figure shows the base function tray installed in the BCM200 platform base chassis.

**Figure 3** BCM200 platform base chassis and primary components




## BCM200 platform base chassis

The BCM200 platform base chassis design provides multiple points of access to the base platform hardware components. The front of the chassis has three assemblies that house one base function tray and two media bay modules (MBMs). The rear of the chassis provides mount points for the fan and power supply. The rear of the chassis also has a removeable panel to provide access to the hard disk. The top cover has a removable section to allow access to the cables, connectors, power supply, hard disk, and cooling fan.

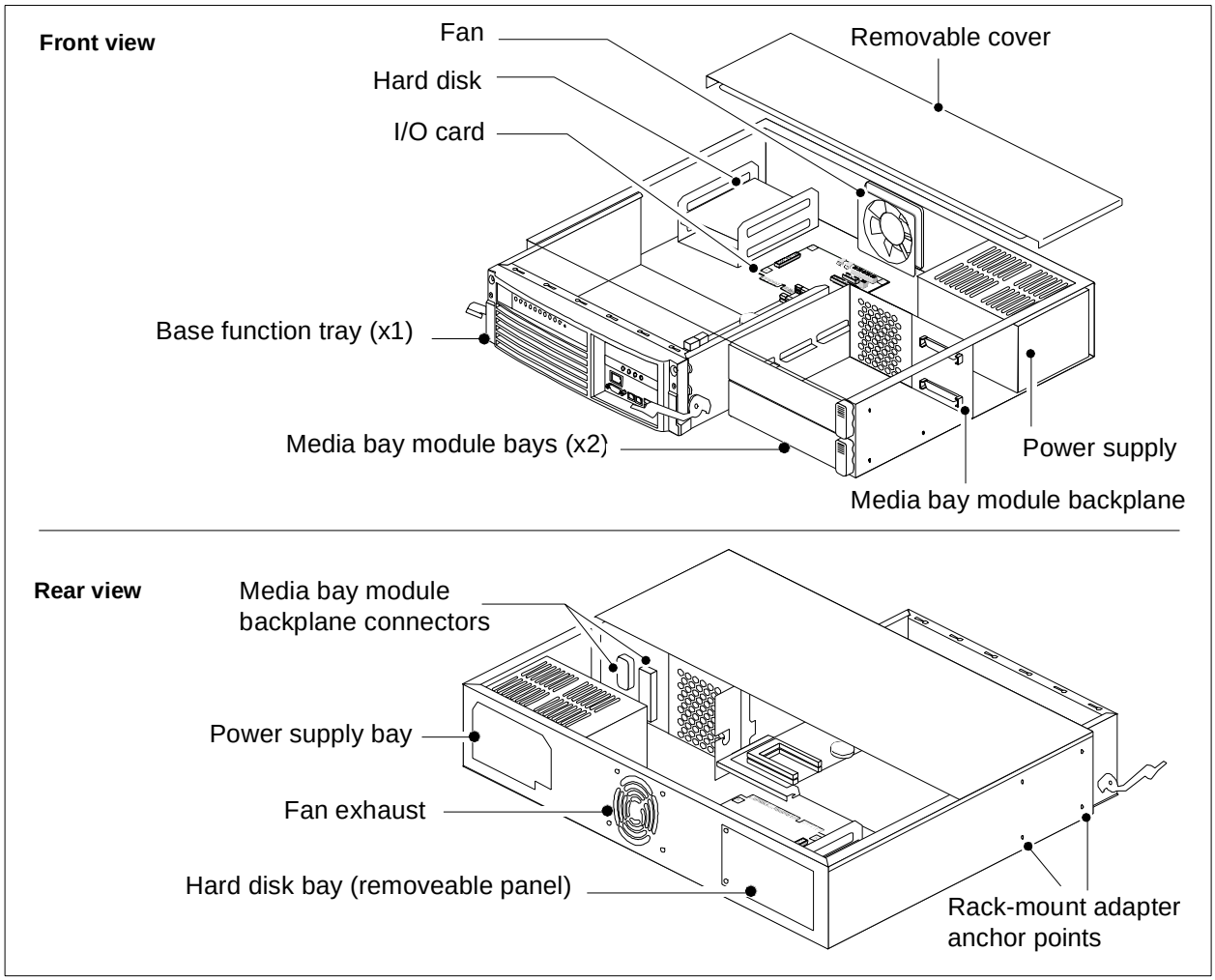
Rack mount brackets allow you to install the chassis in a server rack. An optional wall mount bracket is avialable separately. Rubber feet attach under the platform base chassis if you want to place the Business Communications Manager unit on a flat surface. For further information on chassis bracket installation, refer to Chapter 3, “Install the Business Communications Manager and Expansion Unit Platform Base Chassis’.

The chassis interior contains the following hardware components:

- 1 x programed hard drive (or field redundancy upgrade provides an additional hard disk and redundant array of independant disks [RAID] controller card) (see “Hard Disk” on page 68)
- 1 x auto-sensing power supply (standard)(see “Platform Power Supply” on page 66)
- 1 x system cooling fan (see “Cooling Fan” on page 70)

Figure 4 shows the location of the hardware components in the BCM200 platform base chassis. Nortel Networks recommends that you know the location of the different components before attempting to install or maintain the system.

**Figure 4** BCM200 platform base chassis



# BCM400 Platform Base Hardware

This section provides a description of the BCM400 platform base hardware and chassis components. This section provides the following information:


- "BCM400 platform base chassis" on page 46
- "BCM400 standard (STD) configuration hardware components" on page 46
- "BCM400 platform redundant feature option (RFO) configuration" on page 48
- "BCM400 advanced function tray (AFT)" on page 49


The BCM400 platform consists of a platform base chassis equipped with advanced and base function trays, and four media bay module bays. The advanced function tray contains a hard disk and a bay for future use. The base function tray provides call processing functions and interface connections. The media bay modules (MBMs) provide telephony features.

Use the rack mount brackets to install the chassis in a server rack. Rubber feet attach under the platform base chassis if you want to mount the Business Communications Manager unit on a flat surface. An optional wall mount bracket is available.

The BCM400 platform is available either in a standard (STD) or redundant feature option (RFO) configuration. The BCM400 STD and RFO platform base hardware share the following common components:

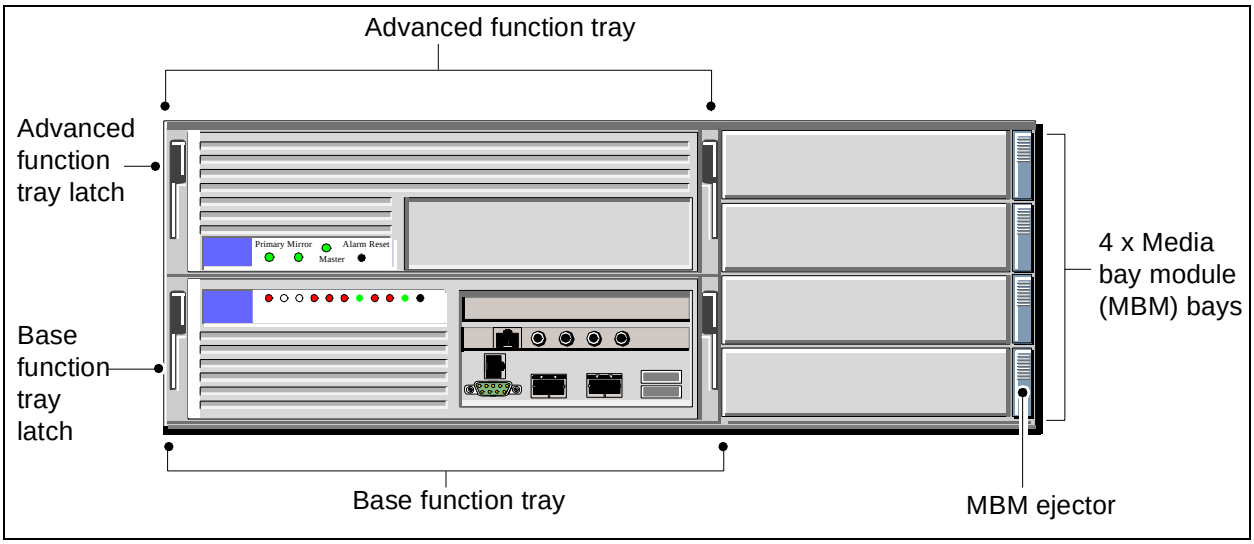
- 1 x platform base chassis
- 1 x sliding advanced function tray (AFT)
- 4 x sliding media bay module bays (MBM)
- 1 x sliding base function tray (BFT)

The BCM400 RFO additional components are as follows:

- RAID controller card
- Additional hard disk for RAID controller card
- Redundant chassis cooling fan and fan panel
- Redundant power supply cage and power supply modules

Figure 5 illustrates the BCM400 RFO configuration. The figure shows the base and advanced function trays installed in the BCM400 platform base chassis.

**Figure 5** BCM400 platform base chassis and primary components




## BCM400 platform base chassis

The BCM400 platform is available in either a standard (STD) or RFO configuration. Nortel Networks recommends that you know the location of the different components before attempting to install or maintain the system. The BCM400 platform base chassis design provides multiple points of access to the base platform hardware components. The front of the chassis has two, sliding tray assemblies that house the base function tray and advanced function tray. Four bays accomodate the media bay modules (MBMs). For more information on the chassis interior hardware components, see Media bay modules (MBMs) on page 73.

The rear of the chassis provides mount points for the fan and power supply. The top cover has fixed and removable sections. Remove the rear portion of the cover to access the cabling, power supply cage, and hard disk components. Use the chassis adapters to install the chassis in a server rack. An optional wall mount bracket is available separately.

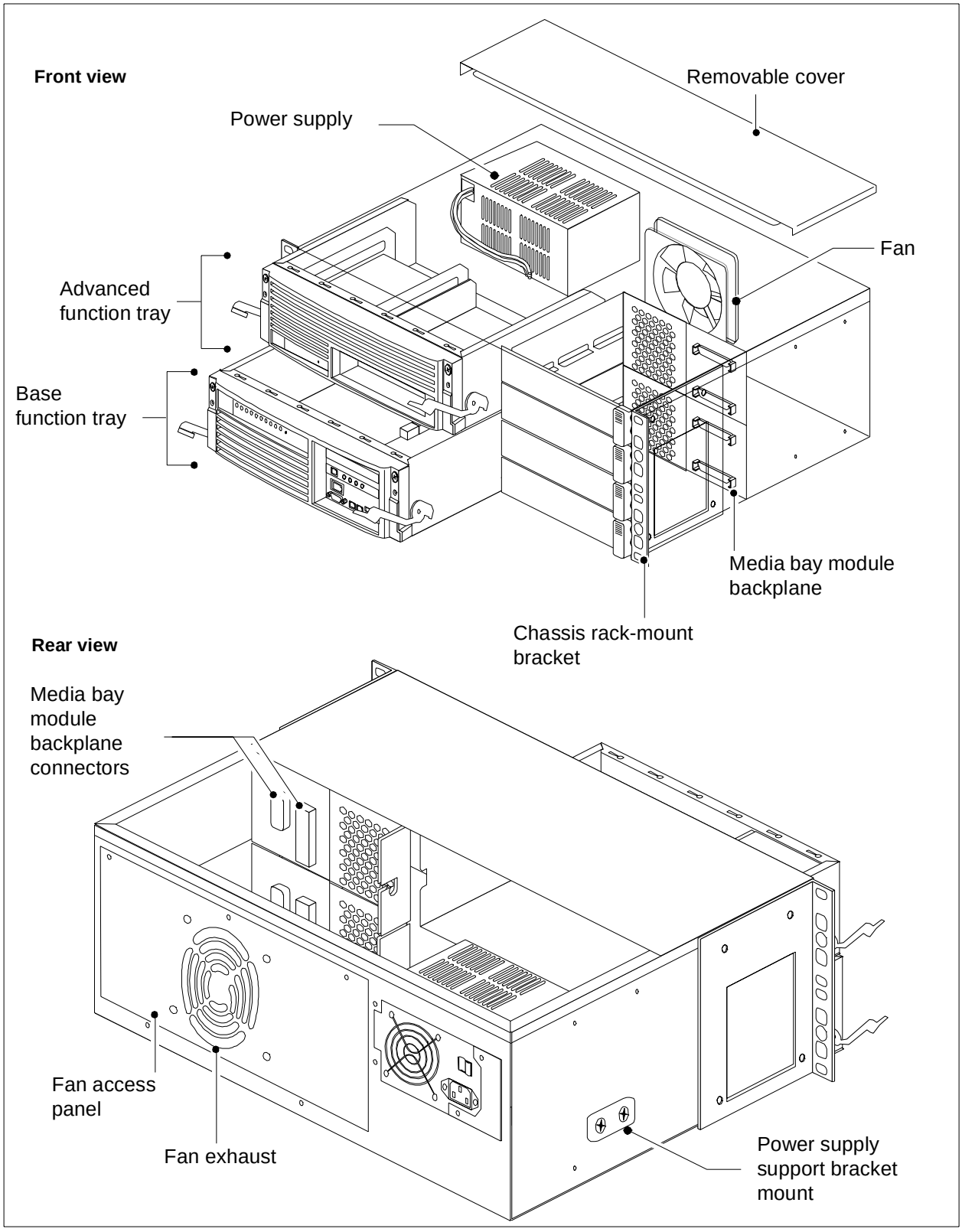
## BCM400 standard (STD) configuration hardware components

The BCM400 standard configuration is equipped as follows:

- 1 x main card
- 1 x media services card (MSC) with two processor expansion cards (two additional cards can be added)
- 1 x programed hard drive
- 1 x auto-sensing power supply
- 1 x system cooling fan

Figure 6 shows the location of the hardware components (standard configuration) in the BCM400 platform base chassis.

**Figure 6** BCM400 platform base chassis (standard configuration)

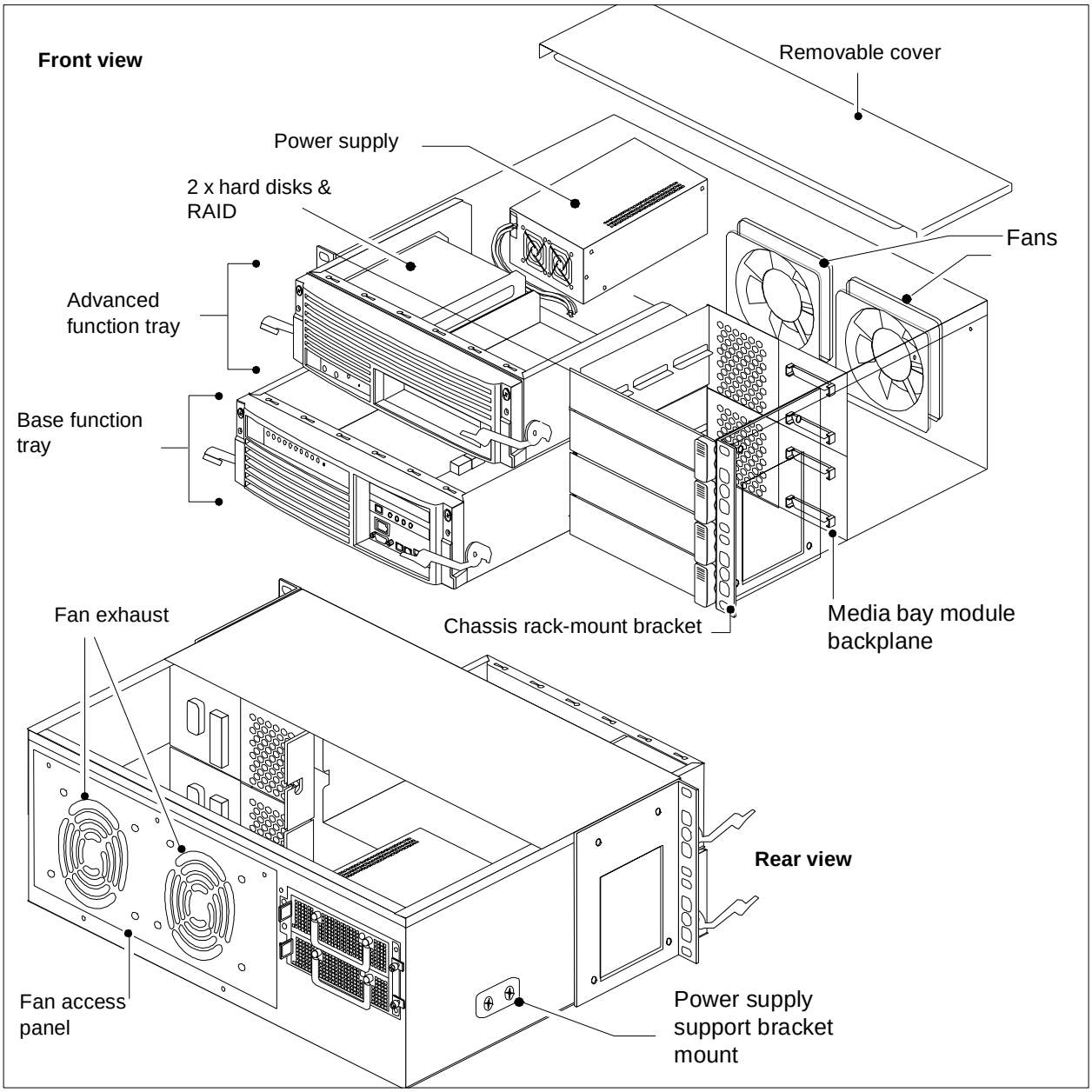


## BCM400 platform redundant feature option (RFO) configuration

Figure 7 shows the location of the hardware components in the RFO configuration platform base chassis.

- 1 x media services card (MSC) with two processor expansion cards (two additional cards can be added)
- 2 x hard disks and RAID controller card
- 2 x system cooling fans
- 2 x redundant, hot-swappable power supply modules

**Figure 7** BCM400 platform base chassis (RFO configuration)

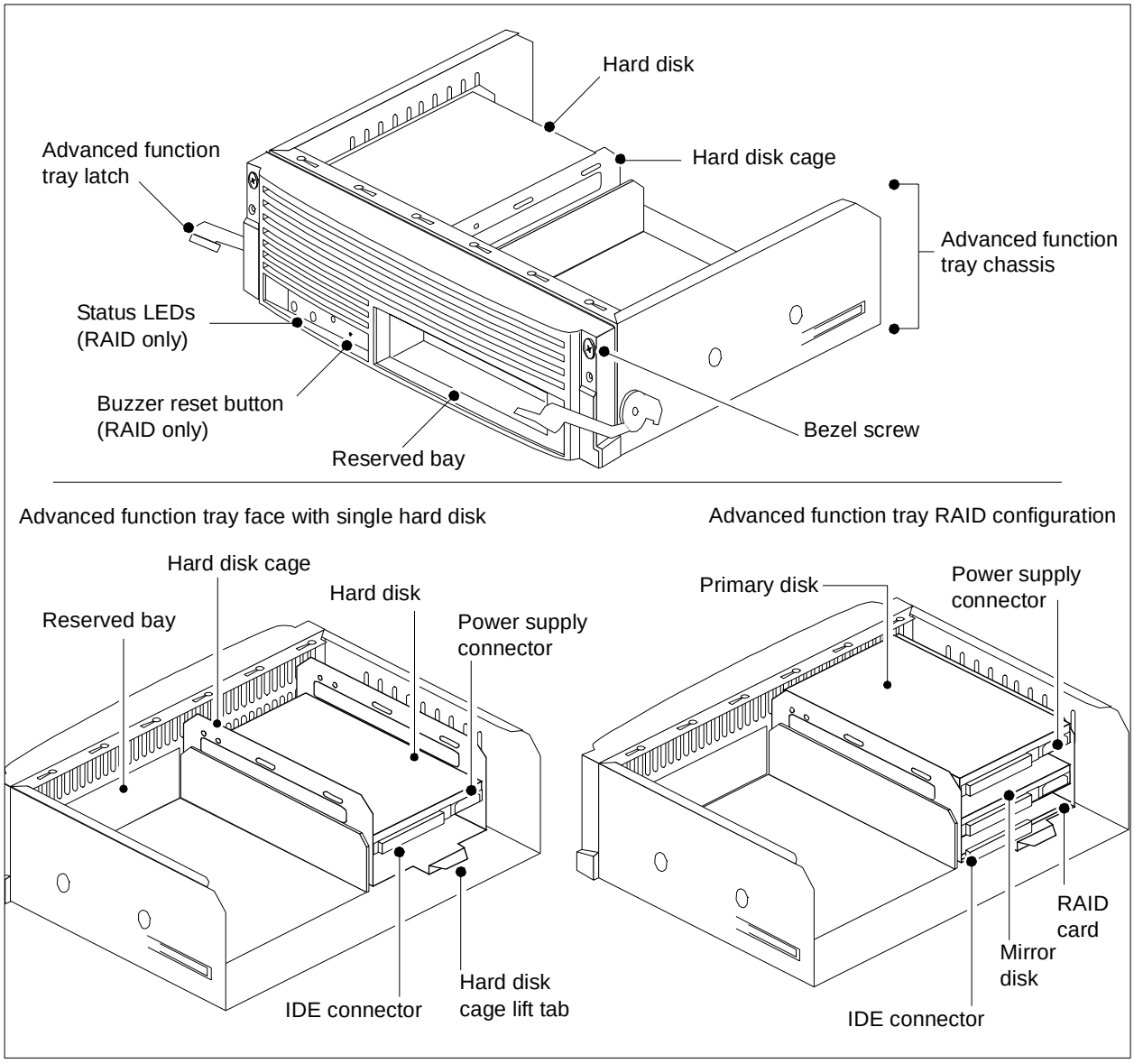


## BCM400 advanced function tray (AFT)

The advanced function tray (AFT) houses the hard disk assembly and an extra, unpopulated bay. The standard configuration contains a single hard disk and has no redundant array of independant disks (RAID) LED display. The AFT in the RFO configuration contains two hard disks, a RAID controller card, and has an LED display to monitor RAID status. The extra, unpopulated bay is reserved for future development. The advanced function tray mounts in the upper BCM400 platform base chassis bay. The advanced function tray slides out and away from the front of the chassis for hard disk maintenance, RAID upgrade or exchange purposes.

Figure 8 illustrates the advanced function tray chassis and faceplate interfaces for the BCM400 standard (STD) and redundant feature option (RFO) platform configurations.

**Figure 8** Advanced function tray



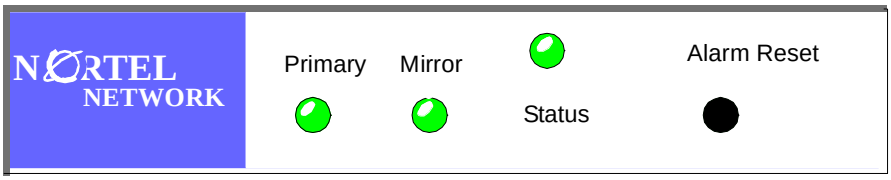
### BCM400 advanced function tray RAID status LEDs

Three LEDs are located on the bezel face of the advanced function tray. The LEDs show the current state of redundant array of independant disks (RAID) hardware components.

The RAID status LEDs indicate monitoring of the following:

- Primary hard disk activity
- Mirror hard disk activity
- RAID card status activity

**Figure 9** Advanced function tray RAID status LEDs

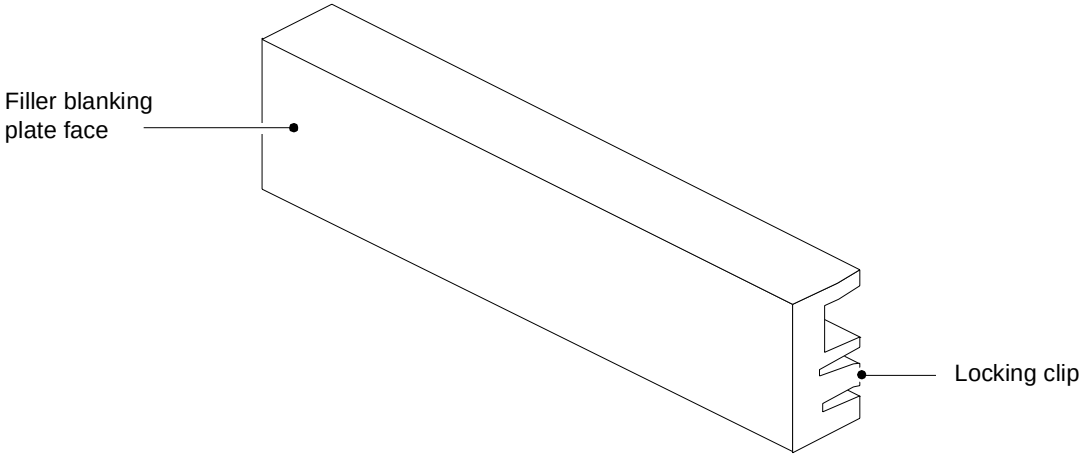



## Platform Media Bay Module Bays and Backplane

The number and configuration of the media bay modules (MBMs) depend on the number of bays available in the platform base chassis and DS30 system resources. The BCM200 platform base chassis provides two media bay module bays. The BCM400 platform base chassis provides four media bay module bays.

All MBM bays must contain either a media bay module or a MBM filler blanking plate. Populate the bays with media bay modules as required. Fill unpopulated MBM bay openings in the platform base chassis with the MBM filler blanking plate (see Figure 10).

**Figure 10** Media bay module filler blanking plate



The MBMs slide into the MBM bays and lock into place. Pull on the MBM ejector to release the MBM or filler blanking plate. The module or filler blanking plate partially ejects from the bay. Slide the the media bay module out of the bay to remove from the platform base chassis.

Figure 11 shows the BCM200 platform MBM bays and release mechanism.

**Figure 11** BCM200 media bay module bays

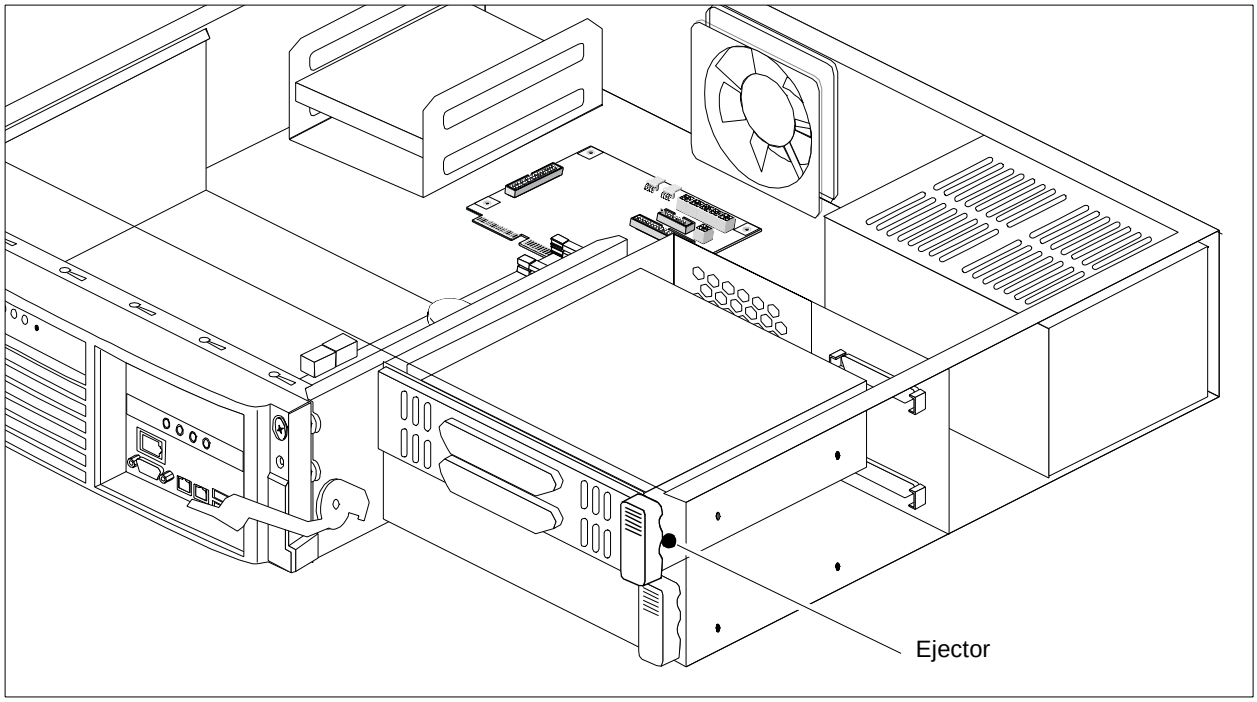
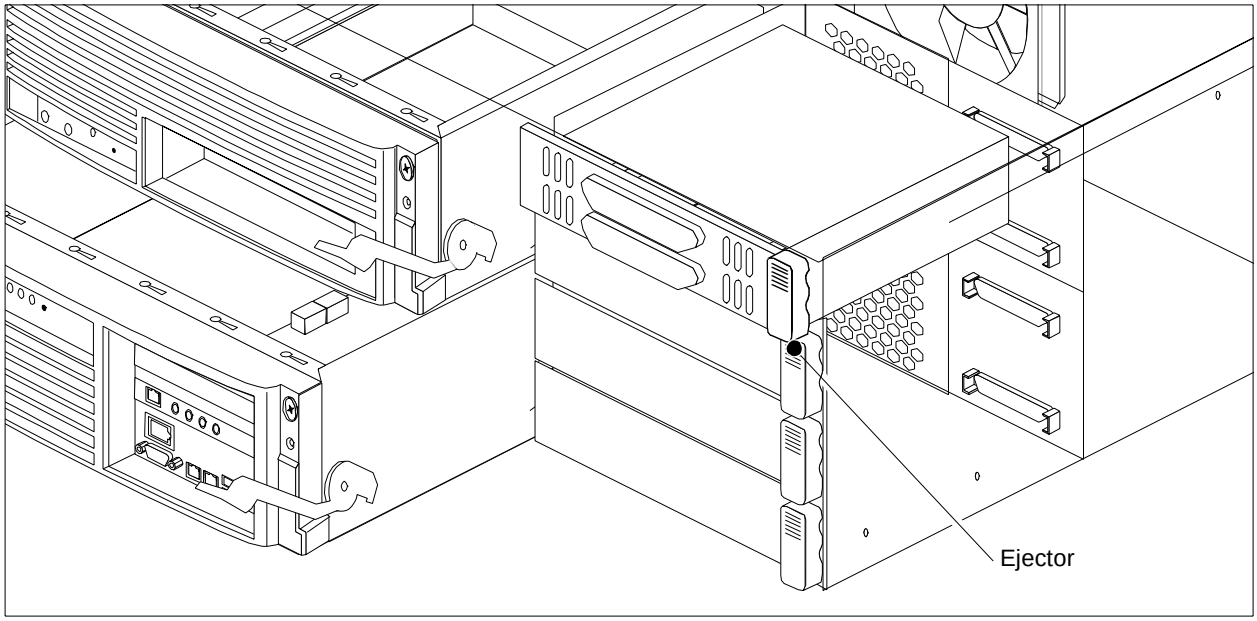



Figure 12 shows the BCM400 platform MBM bays and release mechanism.

**Figure 12** BCM400 Media bay module bays



The MBM backplane provides the MBM component interface to the power supply and main card. The MBM backplane mounts at the rear of the MBM bays and is a non-replaceable chassis component. Figure 13 illustrates the MBM backplane and connectors for the BCM200 platform. Figure 14 illustrates the MBM backplane and connectors for the BCM400 platform.

**Figure 13** BCM200 media bay module backplane

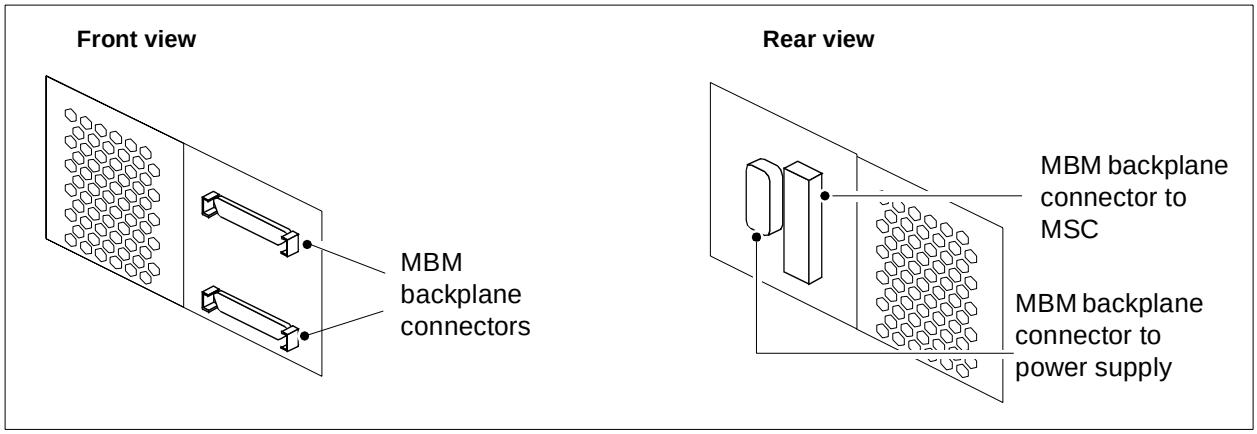
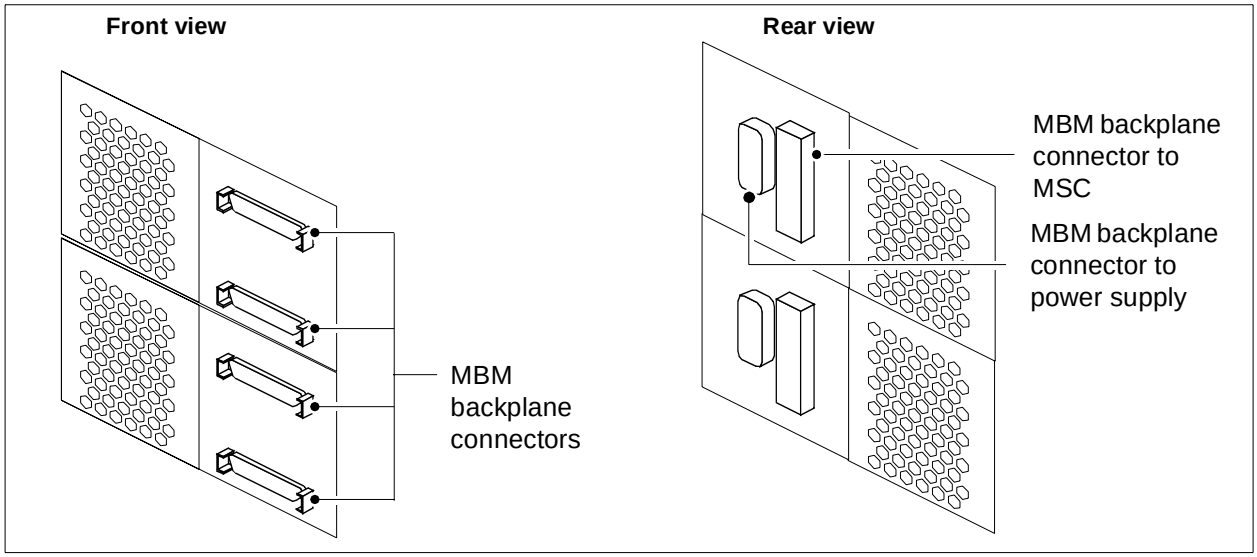



Figure 14 illustrates the BCM400 MBM backplane and connectors.

**Figure 14** BCM400 media bay module backplane



# Base Function Tray Component Hardware

This section provides a description of the base function tray hardware components and includes the following information:


- "Base function tray chassis" on page 54
- "Base function tray interfaces" on page 54
- "Base function tray system status display LEDs" on page 55
- "Media services card (MSC)" on page 56
- "Main card" on page 59
- "Data networking components" on page 62


The base function tray hardware controls all data and telephony tasks, such as call processing, voice messaging, and data routing. The base function tray contains the following hardware components:

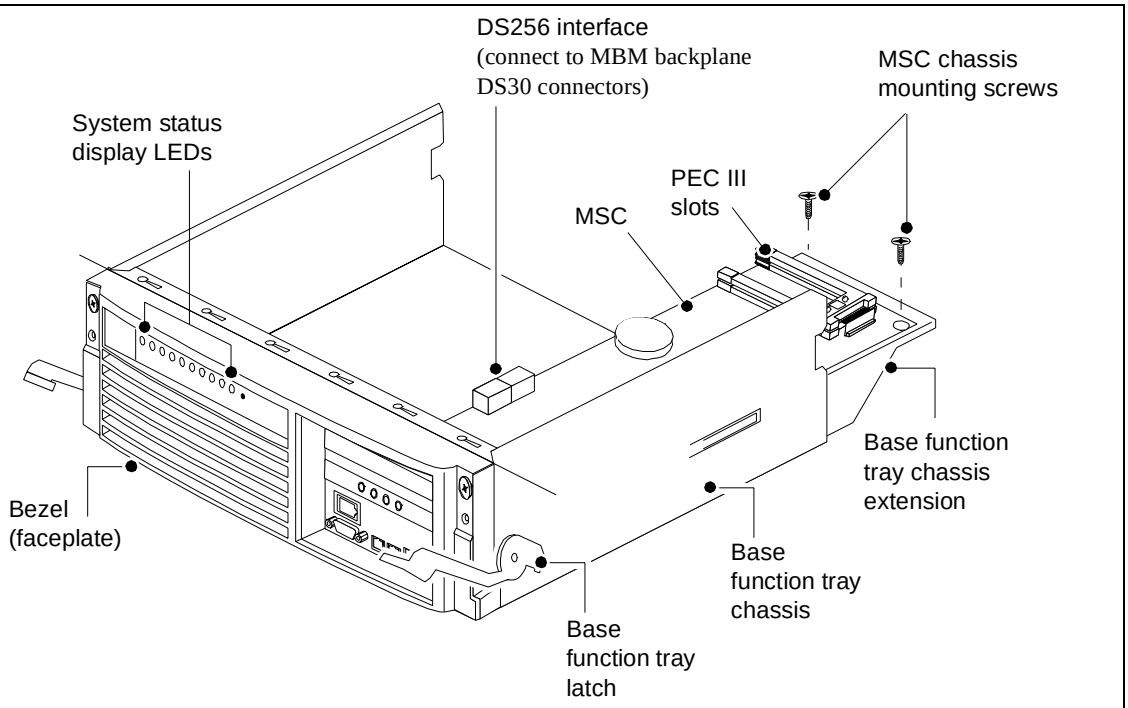
- 1 x base function tray chassis
- System status display (LEDs)
- 1 x media services card
- 1 x main card
- 1 x wide area network (WAN) card (available only as a field upgrade)
- Processor expansion cards (PEC III) - (1 for BCM200 or 2 for BCM400)
- 1 x V.90 modem (North America only)

## Base function tray chassis

The base function tray installs in the platform base chassis and houses the main card with the system interfaces.

Figure 15 illustrates the base function tray chassis layout (BCM200 configuration shown).

**Figure 15** Base function tray hardware and chassis



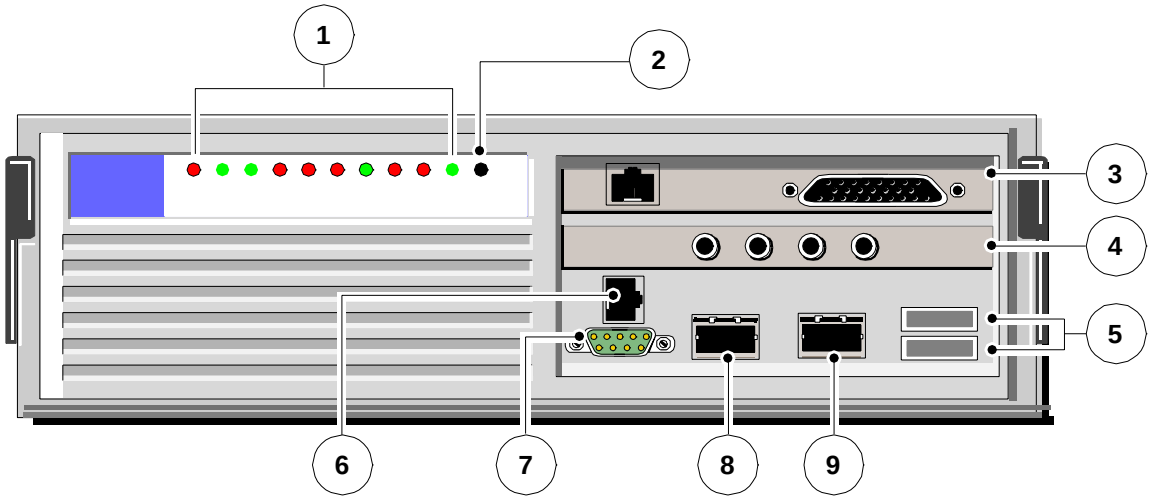

## Base function tray interfaces

You can connect to the Business Communications Manager through the serial port or through a local area network (LAN) port to perform the system initialization. The data networking components connect the Business Communications Manager system to your LAN and/or the wide area network (WAN).

For initialization information, refer to "Use of a null modem serial cable" on page 186 and "Connect the Ethernet crossover cable" on page 191.

Figure 16 illustrates the base function tray ports for the BCM200 platform.

**Figure 16** Base function tray faceplate ports

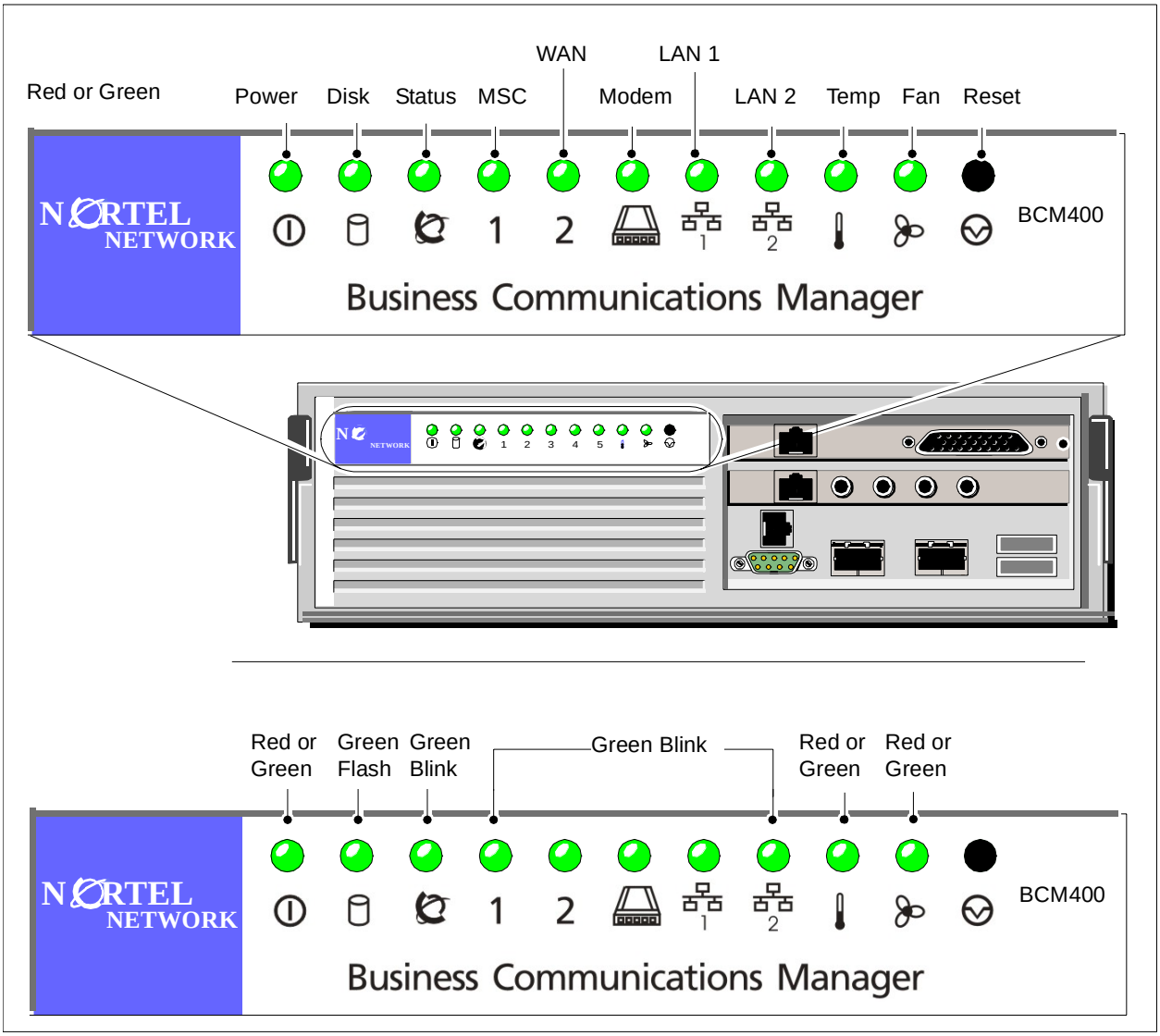



1. System status display LEDs indicate the current status of the hardware components (see Base function tray system status display LEDs on page 55).
2. Reset button restarts the Business Communications Manager
3. WAN card (field upgrade) connects the Business Communications Manager system to the wide area network (WAN). See WAN interface card on page 62.
4. Media Services Card (MSC) performs call processing and media processing of the voice channels for the Business Communications Manager system. See Media services card (MSC) on page 56.
5. USB (Universal serial bus) port A connectors for use with USB-compatible peripherals.
6. Modem port provides PSTN dial-up access to the BCM.
7. COM port provides a serial connection to a laptop for maintenance purposes. Also supports a DB9 serial connection to a UPS for power monitoring (see *UPS Installation and Configuration Guide*).
8. Ethernet port connector #2 provides access to internal local area network
9. Ethernet port connector #1 provides access to external local area network

## Base function tray system status display LEDs

A line of 10 LEDs display on the face of the Business Communications Manager (see Figure 17). The LEDs show the current state of various hardware components. The Unified Manager contains a monitoring tool that allows you to determine the current condition of the LEDs from your computer. Refer to “System Status Display LEDs” on page 370.

**Figure 17** Business communication manager base function tray system status display LEDs




## Media services card (MSC)

The media services card (MSC), a peripheral component interface (PCI) card, performs call processing and media processing of the voice channels for the BCM system, including the VoIP trunks. This card also offers connections for auxiliary features, including external, customer-supplied hardware for paging and music-on-hold.

Figure 18 shows the MSC components for the BCM200 platform. Figure 19 shows the MSC components for the BCM400 platform.

**Figure 18** BCM200 media services card

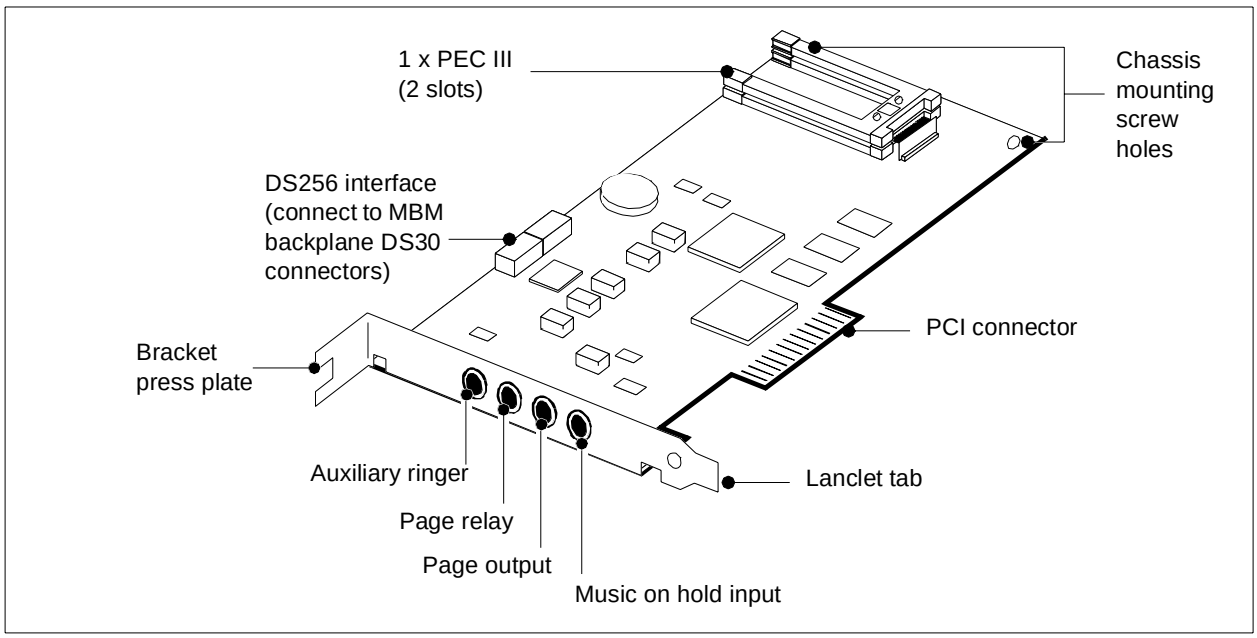
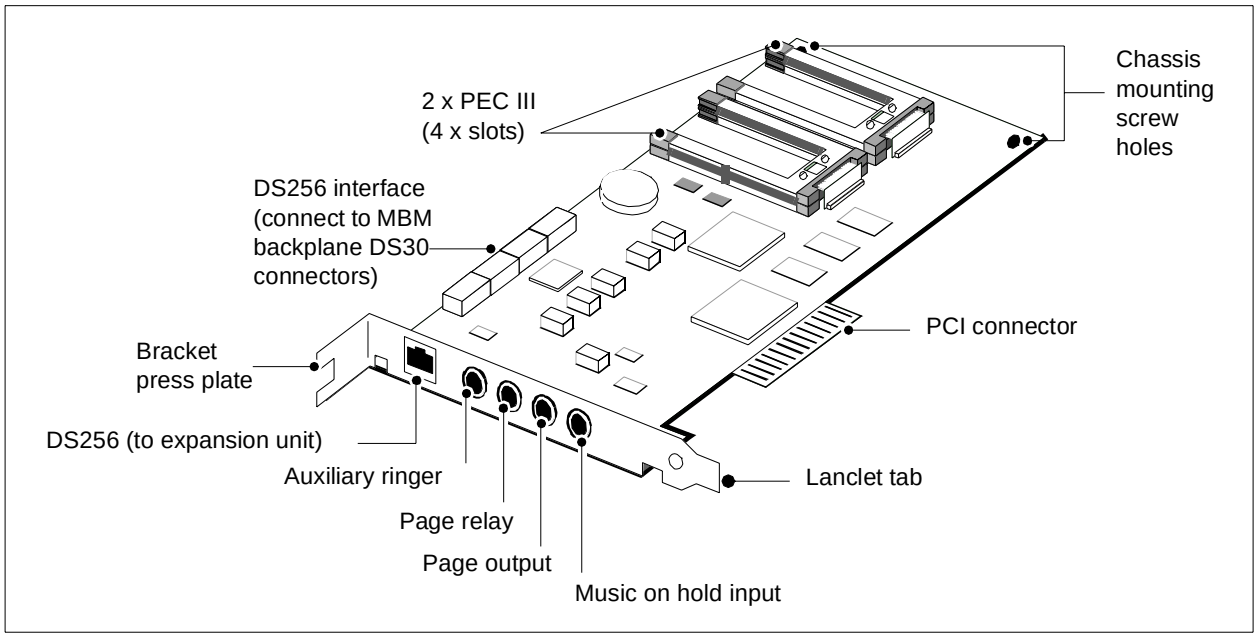



**Figure 19** BCM400 media services card




**Warning:** External equipment connected to the auxiliary ringer, page relay, page output, and music-on-hold interfaces must use safety extra low voltage (SELV).
All four interfaces are (SELV) and the external equipment connected to these interfaces must be SELV. If these interfaces are not SELV, you must use external line isolation units (LIU).

The MSC faceplate offers the following optional connections.

- **DS256 connector (BCM400):** The Business Communications Manager expansion unit connects to the Business Communications Manager through the DS256 jack on the MSC faceplate.

  The DS256 cable to make this connection is provided with the purchase of an BCM1000e expansion chassis.

- **Auxiliary ringer jack:** The Business Communications Manager uses the auxiliary ringer jack to control the cadence of an auxiliary ringer (customer supplied). You must use this output in a low current, low voltage application only. Do not use this output for switching the auxiliary ringer directly.
- **Page relay jack:** When you use the page signal output jack to connect an external paging amplifier, you also use the page relay jack. The page relay jack connects a floating relay contact pair. The Business Communications Manager uses this jack to control the external paging amplifier.
- **Page output jack:** The Business Communications Manager uses the page output to connect an internally generated voice paging signal to an external paging amplifier (customer supplied).
- **Music on hold jack:** The Business Communications Manager uses the music-on-hold input to connect an external music source that supplies a signal to held lines (music on hold) or telephone speakers (background music). The input source can be any available radio or music source approved for connection to the network.

For directions on setting up these features, refer to “Media Service Card Connections” on page 365.

## MSC IP call processing hardware

If your system requires a high volume of IP telephones and/or more IP trunks than the standard eight trunks, you have the option to switch a DS30 bus setting on the MSC from providing service for a media bay module, to providing digital processing service for additional IP telephones and/or trunks. To ensure adequate data flow from the system, you can increase the number of PEC III cards (BCM200 can have maximum of two cards, BCM400 can have a maximum of four).

- **DS30 channels:** DS30 channels are internal communication paths. Each DS30 bus provides a possible 32 signaling channels and 32 media channels.
  - two DS30 buses are exclusively dedicated to MSC data resources. Five paths within these channels have hard-coded applications. The other paths can be assigned to various data applications such as voice mail, dialup ISDN WAN, VoIP trunks, or IP telephony.
  - five DS30 channels are exclusively reserved for the media bay modules
  - the sixth DS30 bus can be switched to accommodate media bay modules or more channels for IP telephones or VoIP trunks. You control the use of the channel by your choice of using either a 2/6 or 3/5 DS30 bus split. This is set when you run the Quick Start Wizard at the initial startup of the system.

For more details about deciding which DS30 bus configuration you want for your system, refer to "Determine module channel requirements" on page 124 and to the chapter on configuring MSC Resources in the *Business Communications Manager 3.0 Programming Operations Guide*.

- **PEC IIIs:** The Business Communications Manager 3.0 uses PEC IIIs to deliver increased capacity for digital signal processing for voice mail, call center, FAX, VoIP trunks, IP telephony, and dialup ISDN WAN features. The BCM200 platform uses one PEC III card (expandable to two). The BCM400 platform uses two PEC IIIs (expandable to four) to accommodate increased requirements for media processing. Refer to the chapter on configuring MSC Resources in the *Programming and Operations Guide*.

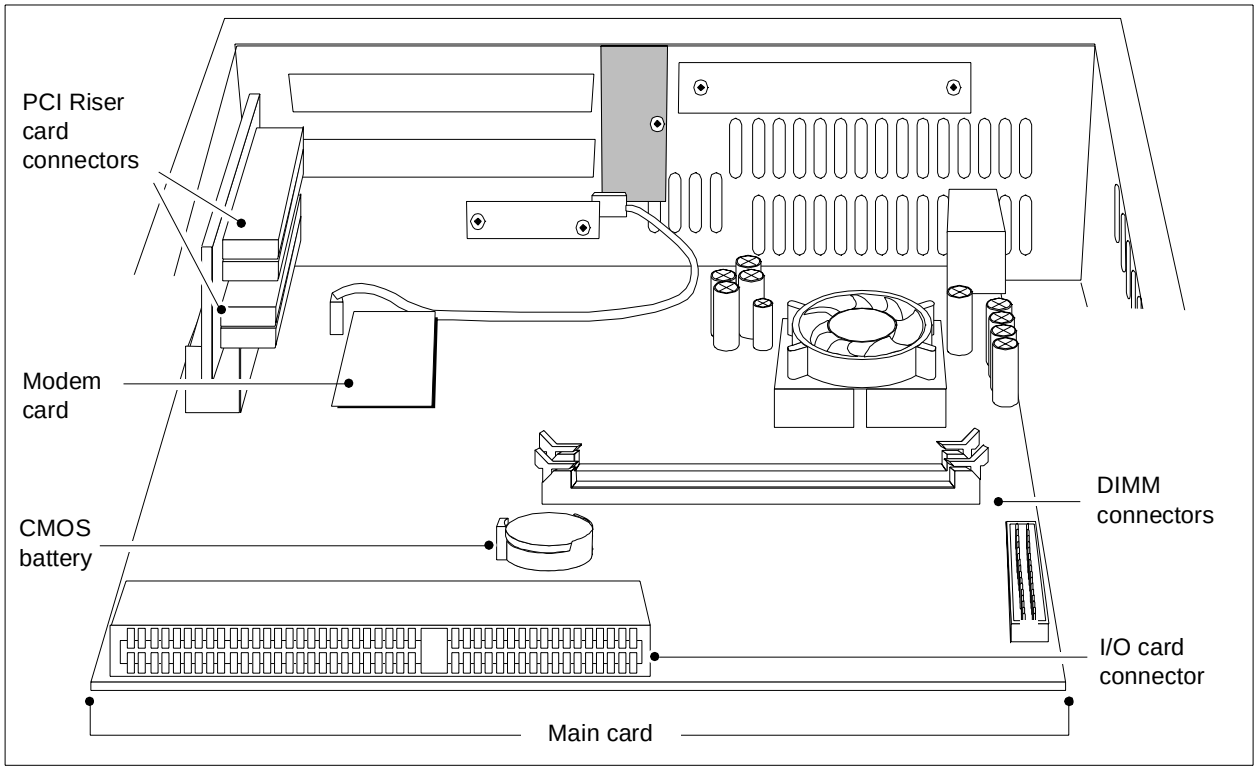
## Main card

The main card contains several field replaceable units (FRUs) such as the RAM, modem card, and CMOS battery. A riser card, set at right angles to the main card, provides connections for the MSC and field installed wide area network card. In North America only, an embedded modem provides connection for a backup analog trunk. Figure 20 shows the layout of the main card as installed in the base function tray.

The main card contains the following hardware:

- 1 x processor
- 1 x 168-pin 256MB DIMM (maximum of 2 x 256MB DIMMS)
- 1 x modem card (North American system only)
- 1 x lithium coin battery cell (CMOS)
- 1 x two-slot PCI riser card

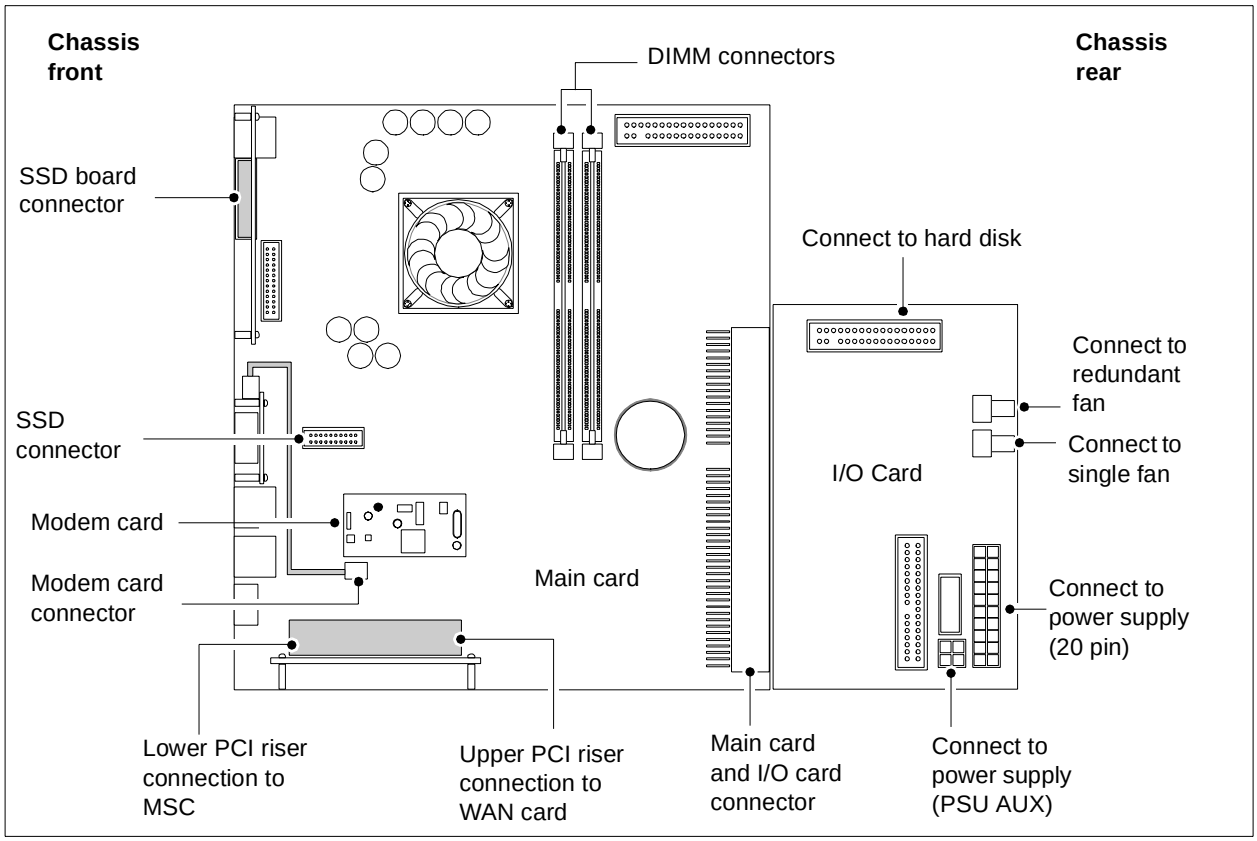
**Figure 20** Main card connectors



## Main card connections

The main card provides peripheral and telephony processing control for the Business Communications Manager system. The main card connects to the I/O card, system status display (SSD) card, and modem interface card. Figure 21 shows the main card and I/O card connectors.

**Figure 21** Card connections




## PCI riser card

The peripheral component interface (PCI) riser card extends upward, and at a right angle, from the main card. The PCI riser card provides a PCI for the MSC and field installed WAN cards. Figure 22 shows the PCI riser card installed in the base function tray.

Figure 23 shows the PCI connectors without the MSC or WAN cards. Two screws at the top of the PCI riser card attach the card to the side of the BFT chassis.

**Figure 22** PCI Riser card

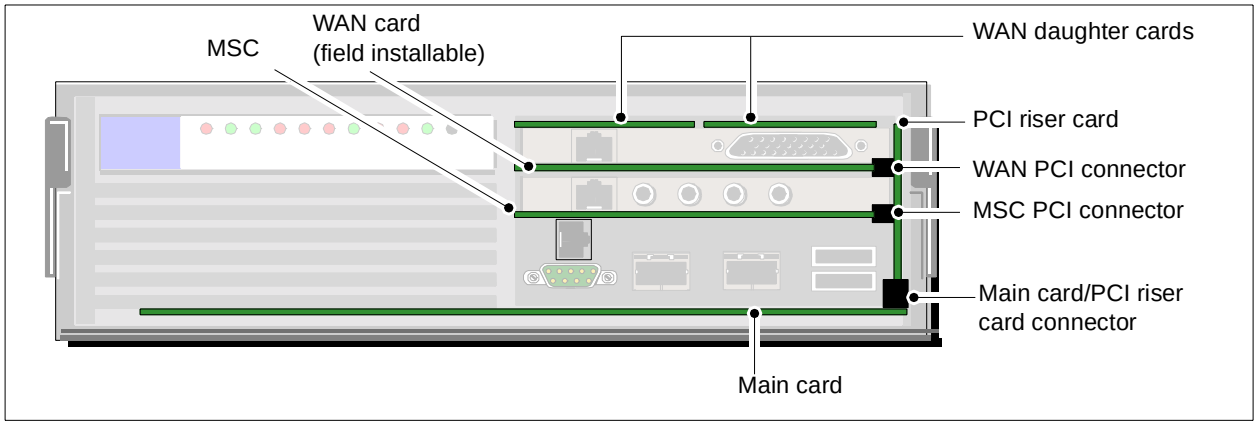
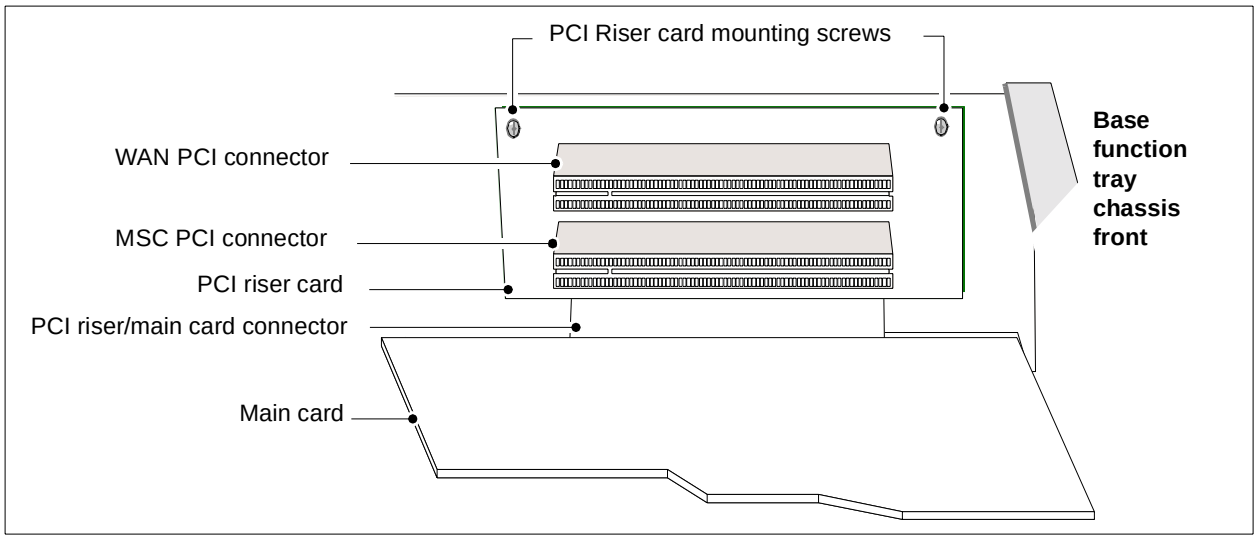



**Figure 23** PCI Riser card connectors




## Data networking components

The data networking components connect the Business Communications Manager system to the wide area network (WAN).

### WAN interface card

The network interface card (NIC) uses a T1 interface and sync port that connects the Business Communications Manager system to the wide area network (WAN). The WAN card is available as a field installed unit. For further information on removal, installation and initialization, refer to "Card Replacement Procedures" on page 283. For configuration information, refer to the *Programming and Operations Guide*.

The international WAN card version (Europe, Middle East, Africa [EMEA]) connects to a channelized T1 TDM circuit with an X.21 or V.35 interface (see Figure 24 on page 63).

The dual V.35 WAN card version connects to channelized T1 TDM circuits using two V.35 interfaces (North America) (see Figure 25 on page 63).

The North American WAN card version connects to a channelized T1 TDM circuit with an integrated T1 DSU/CSU and/or a V.35 interface (see Figure 26 on page 63).

**Figure 24** WAN interface card (international version)

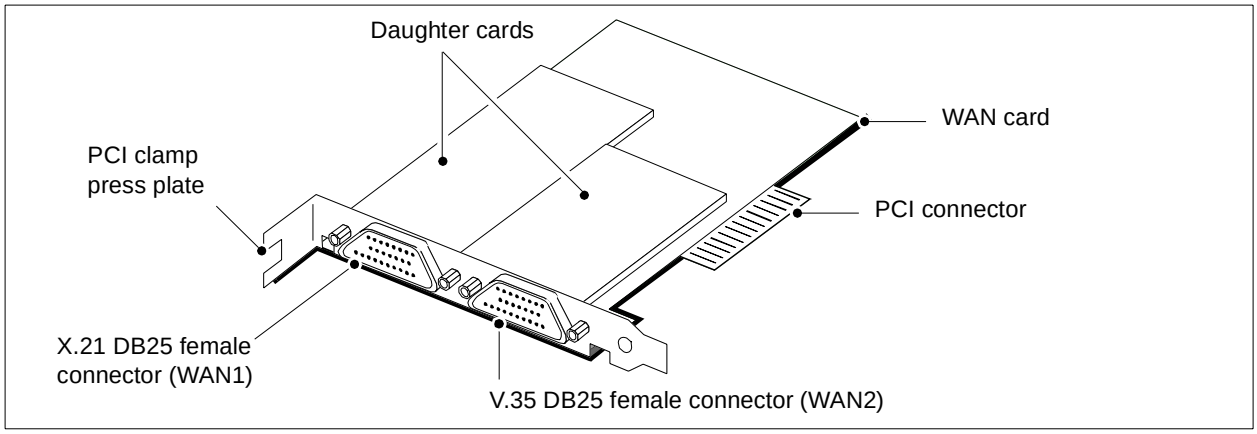



**Figure 25** Dual V.35 WAN interface card

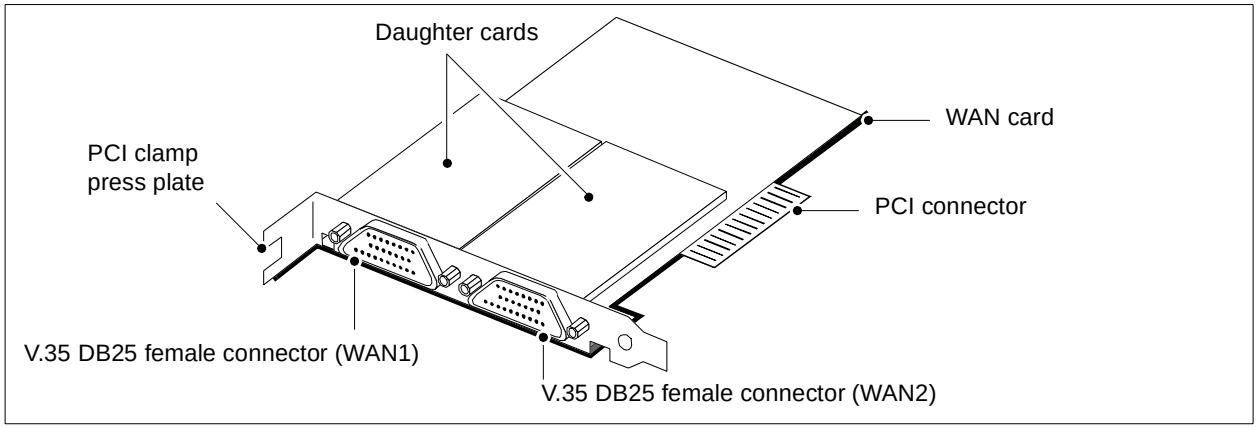
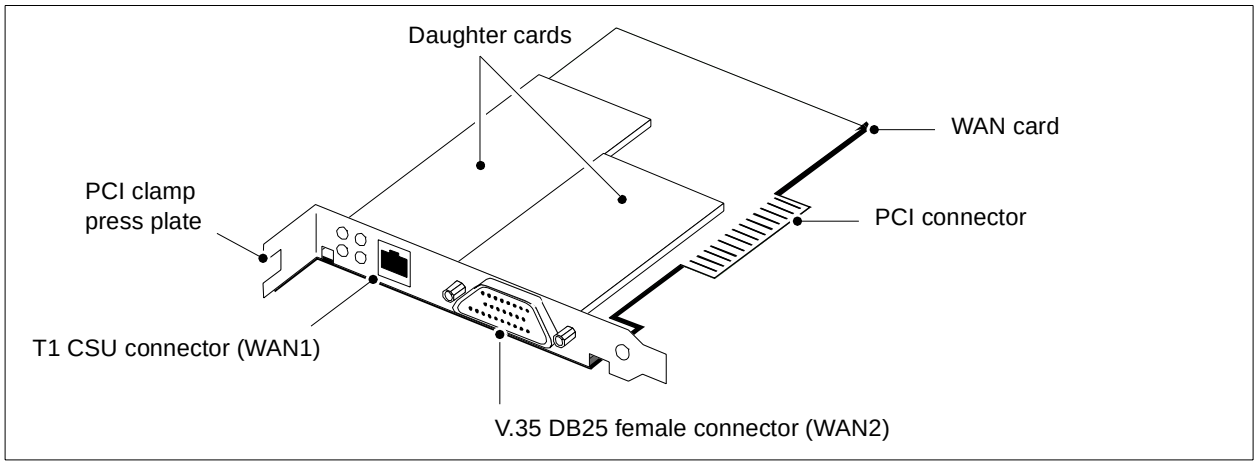



**Figure 26** WAN interface card (North American version)



### Modem card

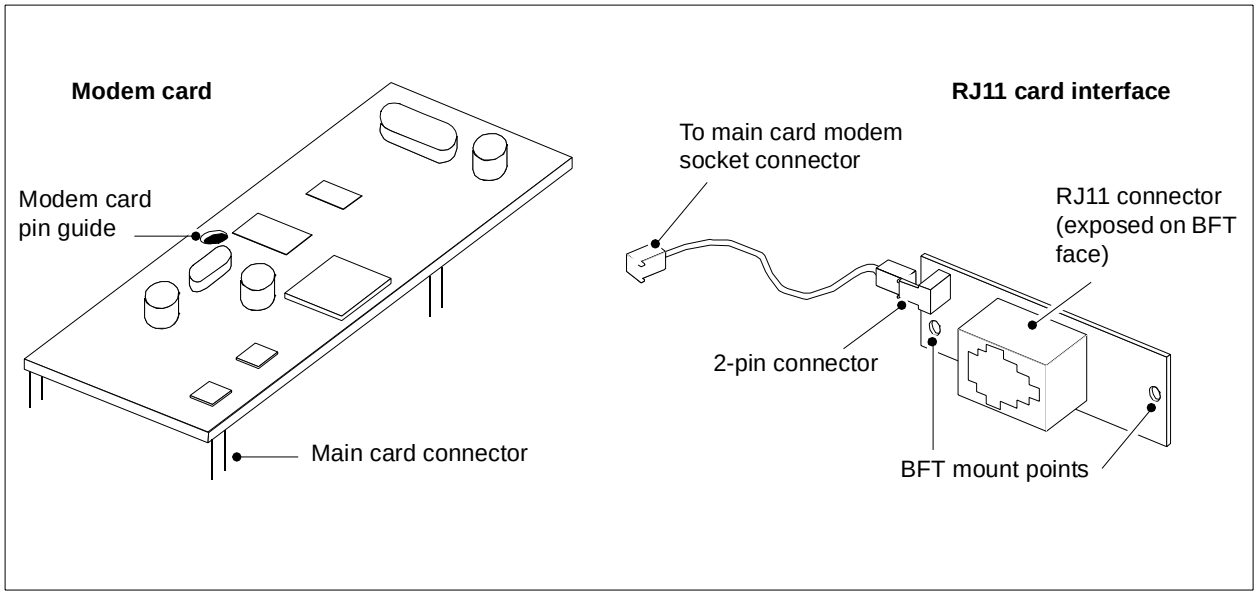
Modem card (Standard on North American systems, optional for APAC/EMEA) — a V.90 modem that sends and receives data using the public telephone system. The modem kit consists of a modem card, RJ11 interface and connector cable. For further information on installation and removal see Install the modem card on page 300 and Remove the modem card on page 297.

The modem connects the Business Communications Manager system to the public switched telephone network. Figure 27 on page 64 shows the modem components.

Use the modem connection to:

- manage the Business Communications Manager system from a different location
- provide dialup backup for a WAN card

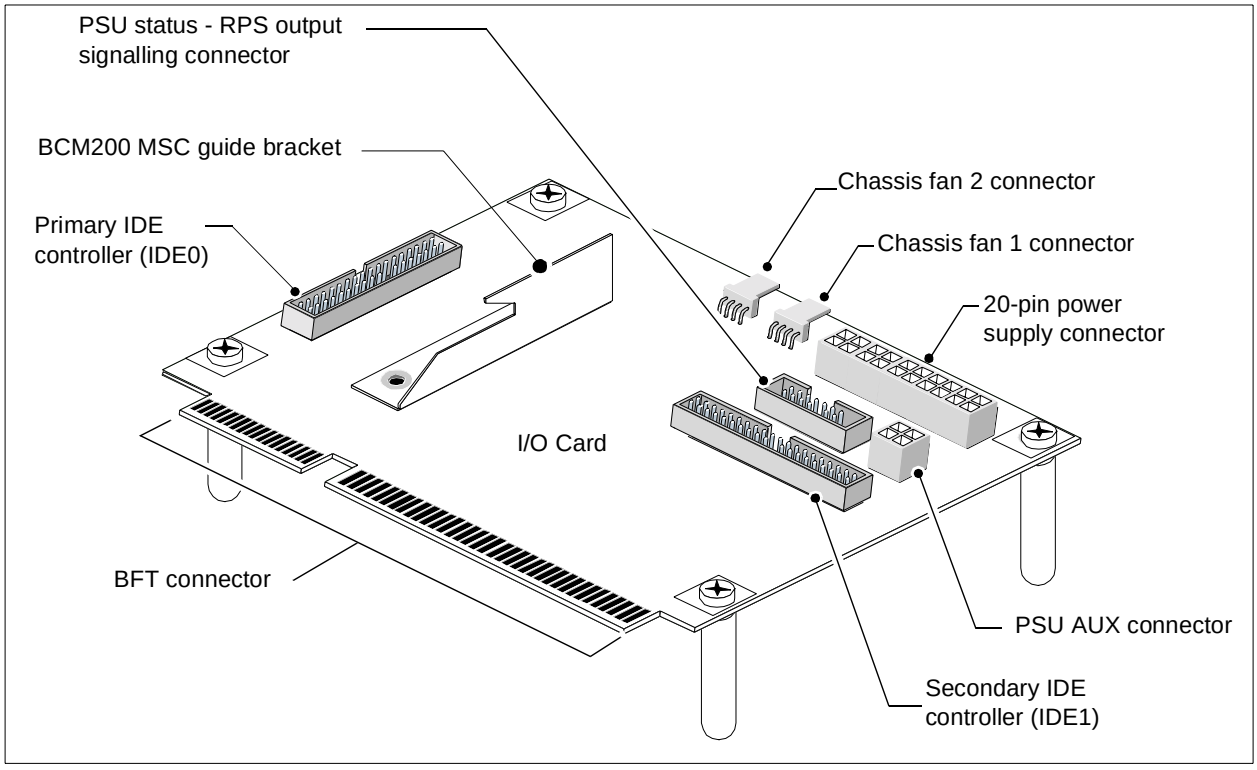
**Figure 27** Modem card and interface




## I/O Interface card

The I/O interface card is a provides signal junction between the base function tray, hard disk, power supply, and cooling system. Figure 28 shows the I/O interface card and connections.

**Figure 28** I/O interface card



# Platform Power Supply

The BCM200 and BCM400 (STD) base platforms use a switched power supply. Internal cabling routes to the I/O card, media bay backplane, and hard disk. External cabling extends to the line power supply outlet. Figure 29 illustrates the standard platform power supply.

**Figure 29** BCM200 and BCM400 (STD) platform power supply (rear view)

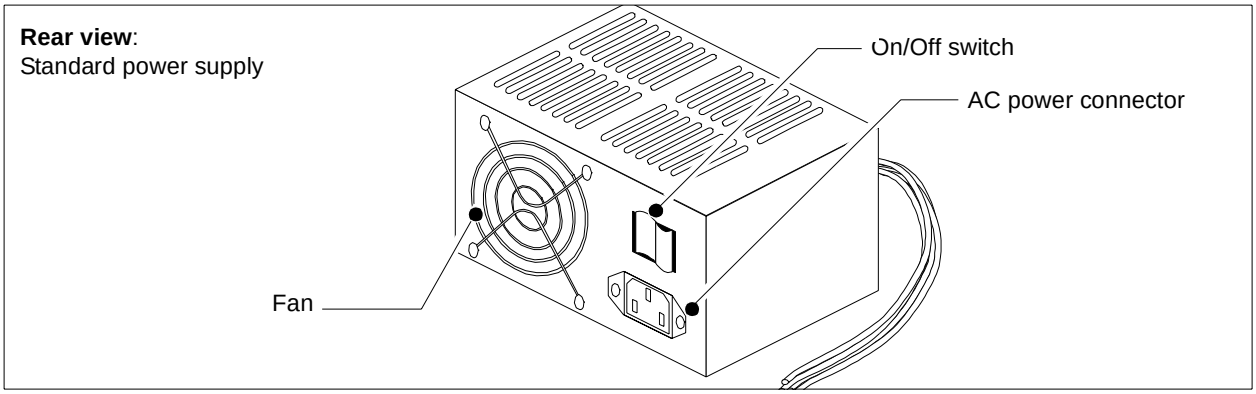
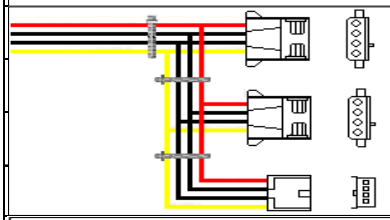
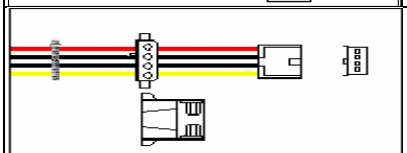
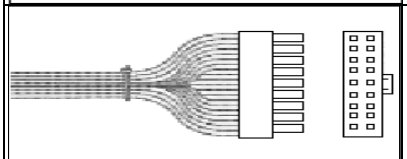
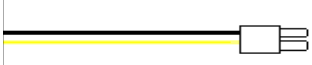



**Figure 30** Standard power supply connectors

| Connector Configuration for Standard Sparkle Power Supply | New Lengths | Purpose and Notes |
|---|---|---|
| | 525mm | MBM Back plane |
| | 525mm | MBM Back plane for BCM400, not required for BCM200 |
|  | 500mm to first, +50mm to next, +100mm to last (total 650mm) tie wrapped every 5cm | Hard disk cage, extra connectors to be tucked under the hard disk |
|  | 430mm to first (right angle) , +150mm to next (total 580mm) | Reserved for future use |
|  | 480mm | I/O Card |
|  | 480mm | I/O Card |

## BCM400 redundant power supply

The redundant power supply (RPS) is available as a field replaceable unit (FRU). The redundant power supply consists of two power supply modules and a power supply chassis. The power supply modules are interchangeable and can be exchanged one at a time during power-on conditions. Figure 31 illustrates the redundant power supply chassis and modules. Figure 32 provides details on the redundant power supply connectors.

**Figure 31** BCM400 platform redundant power supply and modules

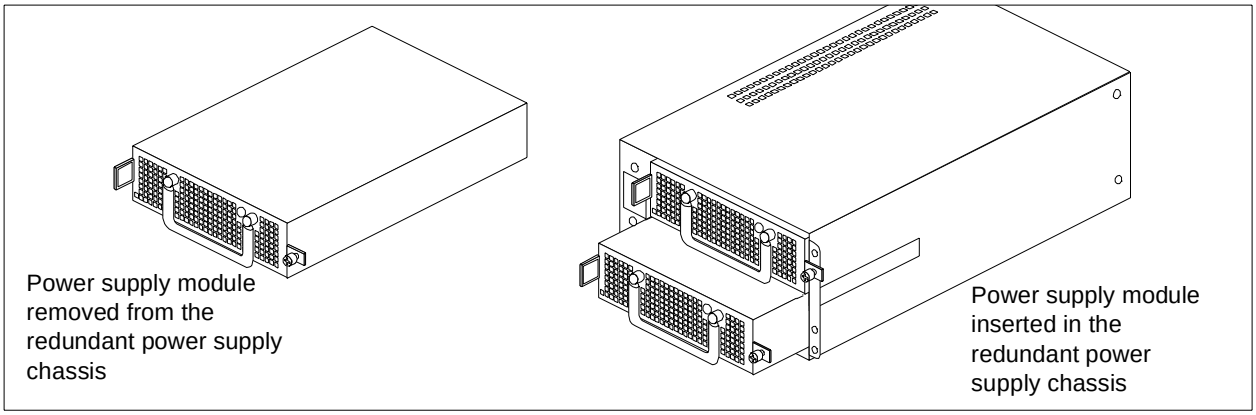
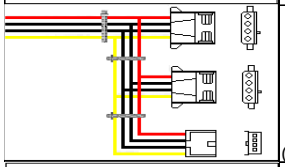
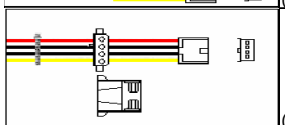
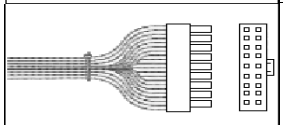
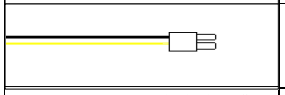
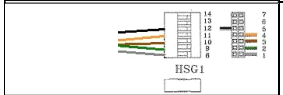
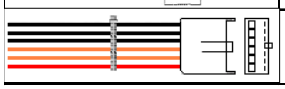

Power supply module removed from the redundant power supply chassis
Power supply module inserted in the redundant power supply chassis

**Figure 32** BCM400 Redundant power supply connectors

| Connector Configuration for Redundant Sparkle Power Supply | Cable Lengths and Markings | **Purpose and Notes** |
|---|---|---|
| | 550mm (P2) | Route to Media bay backplane 1: Tie any slack at the connector (behind the MBM). |
| | 550mm (P3) | Route to Media bay backplane 2: Tie any slack at the connector (behind the MBM). |
|  | 325mm to first (P4), +50mm to next (P5), +100mm to last (P6) (total 475mm) | To hard disk: Tie any slack at the power supply. Tuck any loose connectors under the hard disk cage. |
|  | 340mm to first (P7)(right angle) , +150mm to next (P8) (total 490mm) | Unused. Tie to the center of the hard disk cage. |
|  | 515mm (P1) | Route to the I/O card. |
|  | 515mm (P9) | Route to the I/O card. |
|  | 515mm (PA) | Route to the I/O card. |
|  | 300mm (PB) | Unused |

# Hard Disk

The BCM200 and BCM400 standard configurations use a single hard disk (see Figure 33, Figure 34). For installation and replacement instructions, refer to Chapter 7, “Hard Disk Replacement Procedures’.

**Figure 33** BCM200 standard hard disk and cage

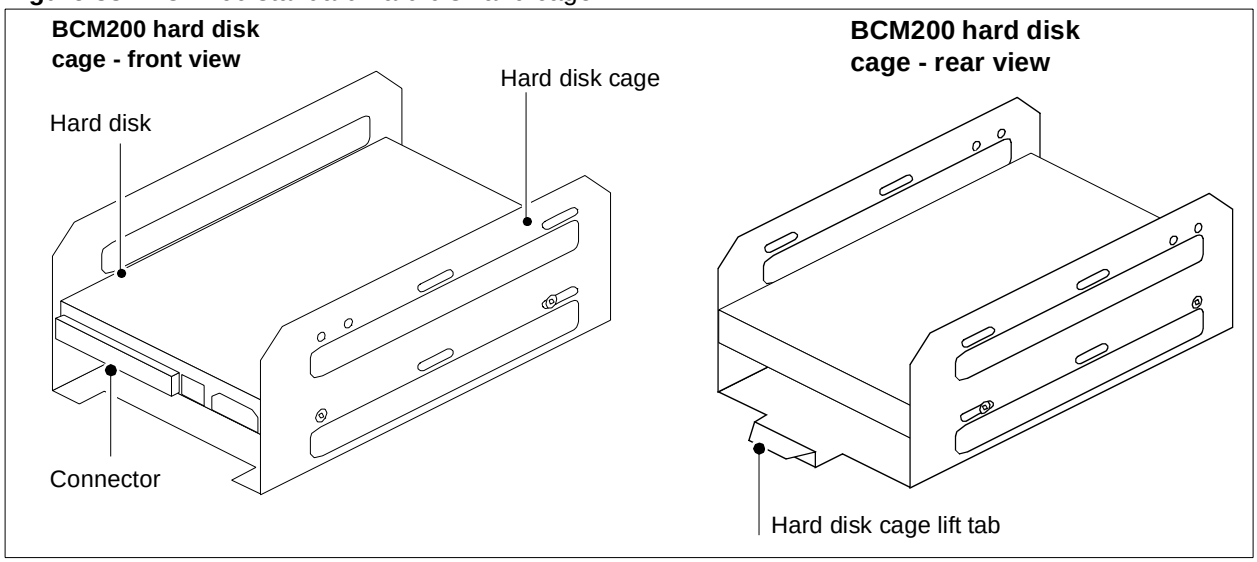
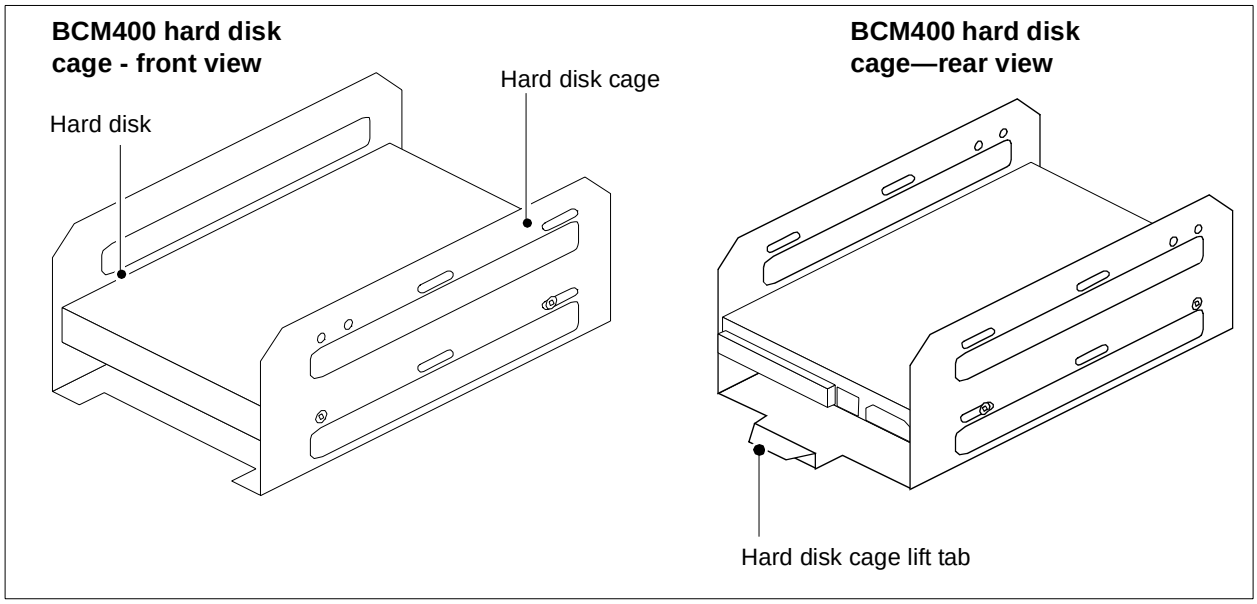

BCM200 hard disk cage - front view
Hard disk cage
Hard disk
Connector
BCM200 hard disk cage - rear view
Hard disk cage lift tab

**Figure 34** BCM400 standard hard disk and cage

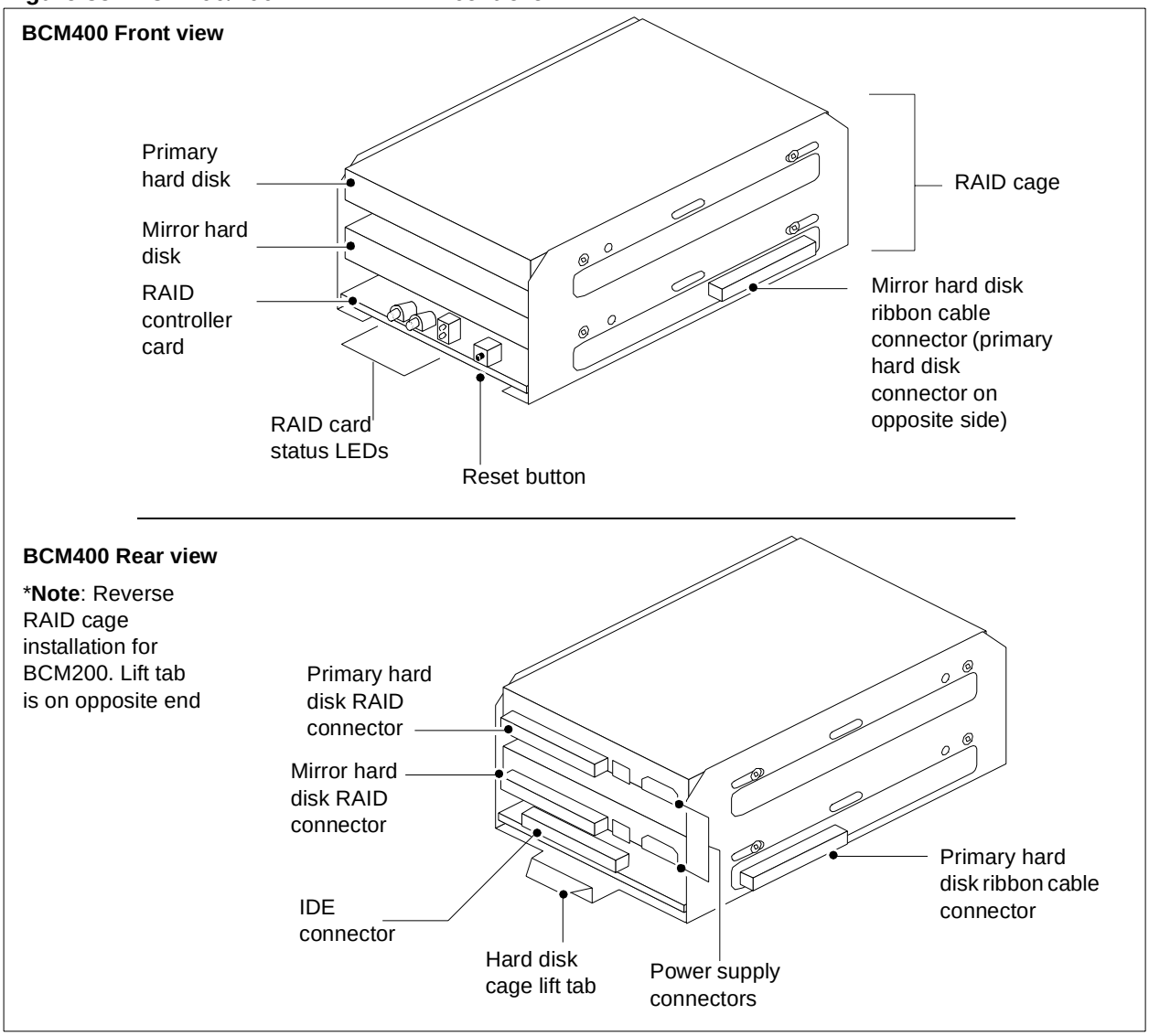


## RAID upgrade kit

The BCM200, BCM400 standard configurations can be equipped with a redundant array of independant disks (RAID) upgrade kit. The RAID upgrade kits are equipped with a single hard disk (mirror) and RAID controller card. Use your current disk (from the single disk system) as the primary. When the RAID upgrade is installed in your systesm, the data from the primary disk is written to the mirror disk. The dual hard disk configuration provides RAID one-fault tolerance capability.

The RAID card has three ribbon cable connectors. The hard disk connectors are mounted on the right and left sides of the RAID controller card. The third ribbon cable connection, mounted at the rear of the card, connects to the primary IDE connector on the I/O card. Figure 35 illustrates the RAID components. For installation methods, refer to Chapter 7, “Hard Disk Replacement Procedures’.

**Figure 35** BCM200/400 2xHDD + RAID controller


BCM400 Front view
Primary hard disk
Mirror hard disk
RAID controller card
RAID card status LEDs
Reset button
RAID cage
Mirror hard disk ribbon cable connector (primary hard disk connector on opposite side)
BCM400 Rear view
*Note: Reverse RAID cage installation for BCM200. Lift tab is on opposite end
Primary hard disk RAID connector
Mirror hard disk RAID connector
IDE connector
Hard disk cage lift tab
Power supply connectors
Primary hard disk ribbon cable connector

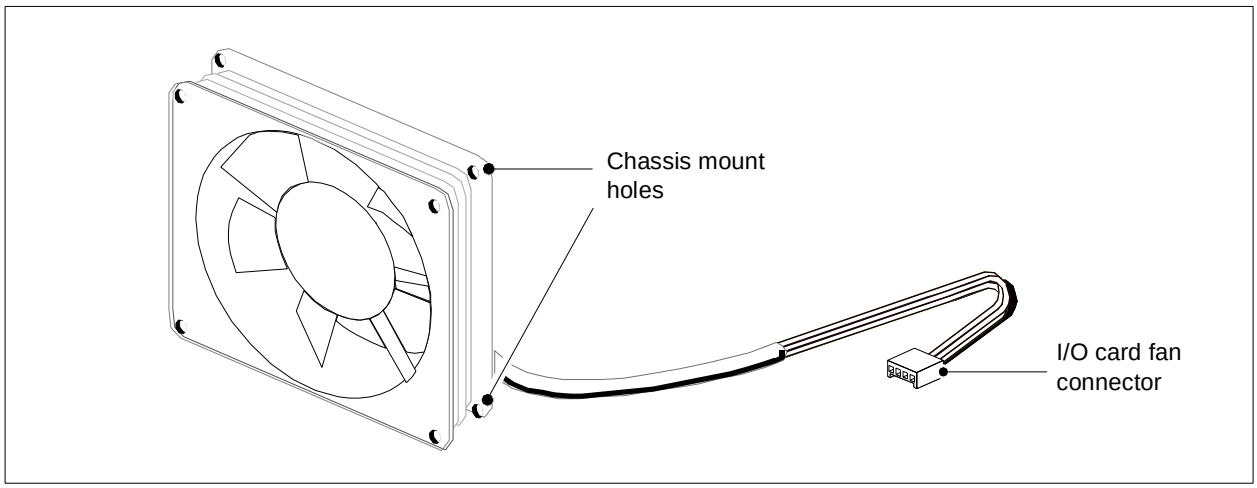
# Cooling Fan

The BCM200/400 standard platforms has a single cooling fan. The BCM400 RFO configuration has two fans. The BCM200 cooling fan mounts on the rear of the platform base chassis.

The BCM400 cooling fan(s) mount on a removable panel at the rear of the platform base chassis. For further information on the platform cooling fans, refer to Chapter 9, “Replace or Upgrade a Power Supply’.

Figure 36 illustrates a cooling fan and connectors.

**Figure 36** Cooling fan




# Telephony Components

This section provides information on the telephony media bay module hardware components and includes the following information:


- “Media bay modules (MBMs)” on page 73
- “Media bay module LED indicators” on page 74
- “Media bay module power connections” on page 74
- “Media bay module dip switches” on page 75
- “Trunk Media Bay Modules” on page 76
- “Station Media Bay Modules” on page 81
- “Specialized media bay modules” on page 86


The telephony components perform call processing by connecting the telephones or peripheral telephony equipment, such as fax machines, to the Public Switched Telephone Network (PSTN) lines. They also process telephony information that has been received through an IP link.

- **MSC:** The media services card (MSC) is a PCI card that performs call processing and media processing of the voice channels. The Business Communications Manager 3.0 MSC contains two PEC IIIs that provide additional voice channel processing for the MSC. Refer to "Media services card (MSC)" on page 56.
- **Media bay modules:** The MBMs connect with external devices to implement various types of voice trunks and stations. Install the MBMs in the media bay module bays in the BCM200, BCM400 base platforms and the expansion unit. For further information on the media bay modules, refer to Chapter 4, "Install, Remove, or Replace the Media Bay Modules," on page 117.
- **Telephones and adapter:** Business telephones and adapters connect to the MBMs installed in the Business Communications Manager system. Business Communications Manager supports Norstar and Business Series Terminal sets, as well as IP-based Nortel sets. Refer to Telephones and adapters on page 91 for a description of the telephones that can be used with the system. The Nortel Networks i2001, i2002, i2004 IP telephones and Nortel Networks i2050 Software Phone have separate installation and operations documentation. Refer to the main index on your system CD.

  The system also supports four types of cordless telephone systems: Companion, DECT, T7406 Business Series Terminal, and the Symbol NetVision and NetVision Data telephones. Companion installation information is included in this guide and in the *Programming Operations Guide*. Installation documentation for the other three systems is provided in separate documentation for each system. Refer to "Telephones and adapters" on page 91 for information about the handsets and the hardware they use to connect to the system.

This section describes the MBM telephony components and various types of telephone equipment used with the Business Communications Manager system. Figure 37 points to the sections that describe the modules and telephones that can be installed into the Business Communications Manager.

The Business Communications Manager system is modular. You can increase the capacity of the system by adding more telephony hardware components (MBMs). Each Business Communications Manager allocates a maximum of six DS30 channels to the media bay modules. The number of media bay modules that can be added to your system is determined by the number of media bays that are open, combined with the number of DS30 channels each component uses.

If your system requires many IP lines or trunks, you can reduce the number of DS30 channels that are assigned to modules and increase the number of channels available to IP telephones. This is known as a 3/5 DS30 channel split. In this case, you only have five DS30 channels available for use by the media bay modules. Refer to "Understand DS30 numbers" on page 122 for more information.

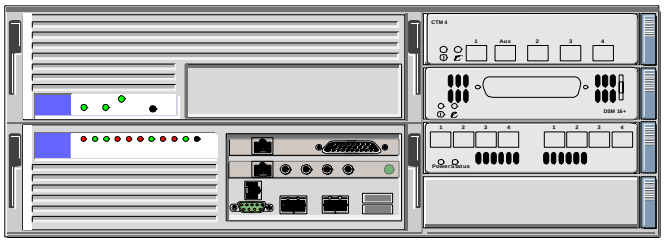
**Warning:** Changing the DS30 channel split

If you change the channel split from 2/6 (default) to 3/5 after the system is initialized, any module set to DS30 channel 7 or requiring the use of channel 7 becomes inoperable.

If you change the channel split from a 3/5 split to a 2/6 split after the system is initialized, all data is lost and all optional applications must be reinstalled and reconfigured.

Refer to Chapter 4, “Install, Remove, or Replace the Media Bay Modules,” on page 117 for details about determining how many MBMs can be installed in a system.

**Figure 37** Telephony hardware components.



“Trunk Media Bay Modules” on page 76

“Station Media Bay Modules” on page 81

“Specialized media bay modules” on page 86

Refer to “Regional media bay module availability” on page 401 and “Regional FEM-trunk module combinations” on page 402 to determine which media bay modules and which types of trunk lines are available in your location.

“Telephones and adapters” on page 91

## Media bay modules (MBMs)

The MBMs connect with external devices to implement various types of voice trunks and stations. Install the MBMs in the media bay module bays in the BCM200, BCM400 base platforms and the expansion unit. There are three types of media bay modules. Thirteen media bay modules are available as optional equipment (as shown in Table 8).

**Table 8** Media bay module list

| Module type | Media bay module name | Faceplate acronym | Reference |
|---|---|---|---|
| Trunk media bay module | Digital trunk interface | DTM | Digital trunk media bay module on page 77 |
| | Caller ID trunk (CLID) 4 line trunk | CTM 4 | Caller ID trunk media bay module on page 78 |
| | Caller ID trunk (CLID) 8 line trunk | CTM 8 | Caller ID trunk media bay module on page 78 |
| | ISDN BRI S/T Interface | ISDN BRI | Basic rate interface (BRI) media bay module on page 79 |
| | Global analog trunk module | GATM8 | Global Analog Trunk Module (GATM) on page 80 |
| Station media bay module | 16 digital station interface (DSI) double density | DSM 16+ | Digital station media bay module (DSM) on page 81 |
| | 32 digital station interface (DSI) double density | DSM 32+ | “Digital station media bay module (DSM)” on page 81 |
| | Combination CTM4 x DSM16 | 4X16 | “4x16 media bay module” on page 82 |
| | Analog Station Interface | ASM 8 | Analog station media bay modules on page 83 |
| Specialized media bay module | DECT Base Station Module | DECT8 | Digital enhanced cordless telecommunications (DECT) media bay module on page 87 |
| | DECT Base Station Module (u-law) | DECT8 | Digital enhanced cordless telecommunications (DECT) media bay module on page 87 |
| | Fibre Expansion Module | FEM 6 | Fiber expansion media bay module (FEM) on page 89 |
| | Digital Drop & Insert MUX | DDI Mux | Digital drop and insert MUX (DDIM) on page 89 |

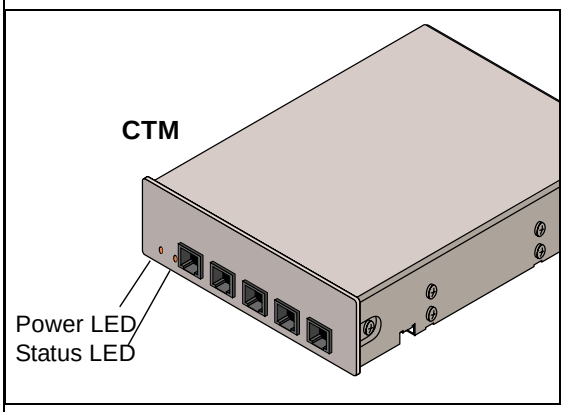
Media bay modules are designed within a common casing, that include the following common features:

- LEDs: All media bay modules have power and status LEDS.
- Power connections: located at the rear of the media bay module
- dip switches: located at the rear of the media bay module

## Media bay module LED indicators

Figure 38 shows the location of the (Power) and (Status) on a CTM. The power and status LEDs are located in the same place on all modules. The figure describes the possible LED states.

**Figure 38** Module Power and Status LED states

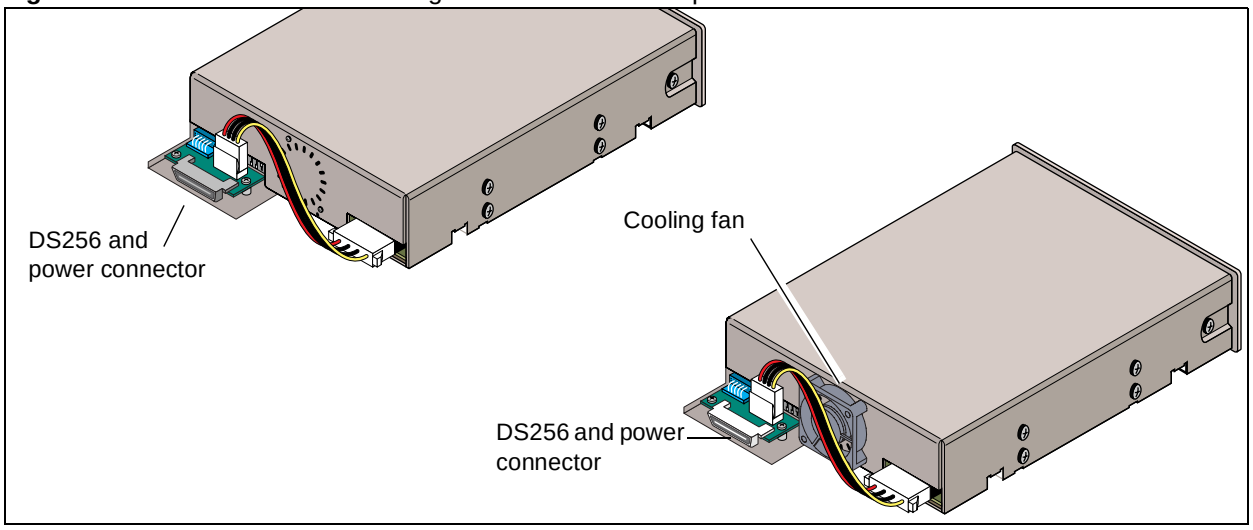



| Power | Status | Description |
|---|---|---|
| Off | Off | No power applied to the module, or failure of module power converter. |
| On | Off | DS30 to MSC failure or system init. |
| On | Blinking | Hardware is working, but there is an operational problem such as:<br>• no DS256 link detected<br>• DS256 frame alignment lost<br>• bandwidth not allocated<br>• module is in maintenance state |
| Blinking | Blinking | Power is applied to module, but there is a hardware problem such as:<br>• partial failure of power converter<br>• thermal overload<br>• fan failure |
| On | On | The module is read to operate. |

## Media bay module power connections

The back of the modules have a single connector that provides a DS256 channel and power to the module. These connectors plug into the media bay backplane on the Business Communications Manager or expansion unit. Some modules also have a cooling fan that runs off the module power source. Figure 39 shows the rear views of the two types of modules.

**Figure 39** Rear of modules showing DS256 channel and power connectors

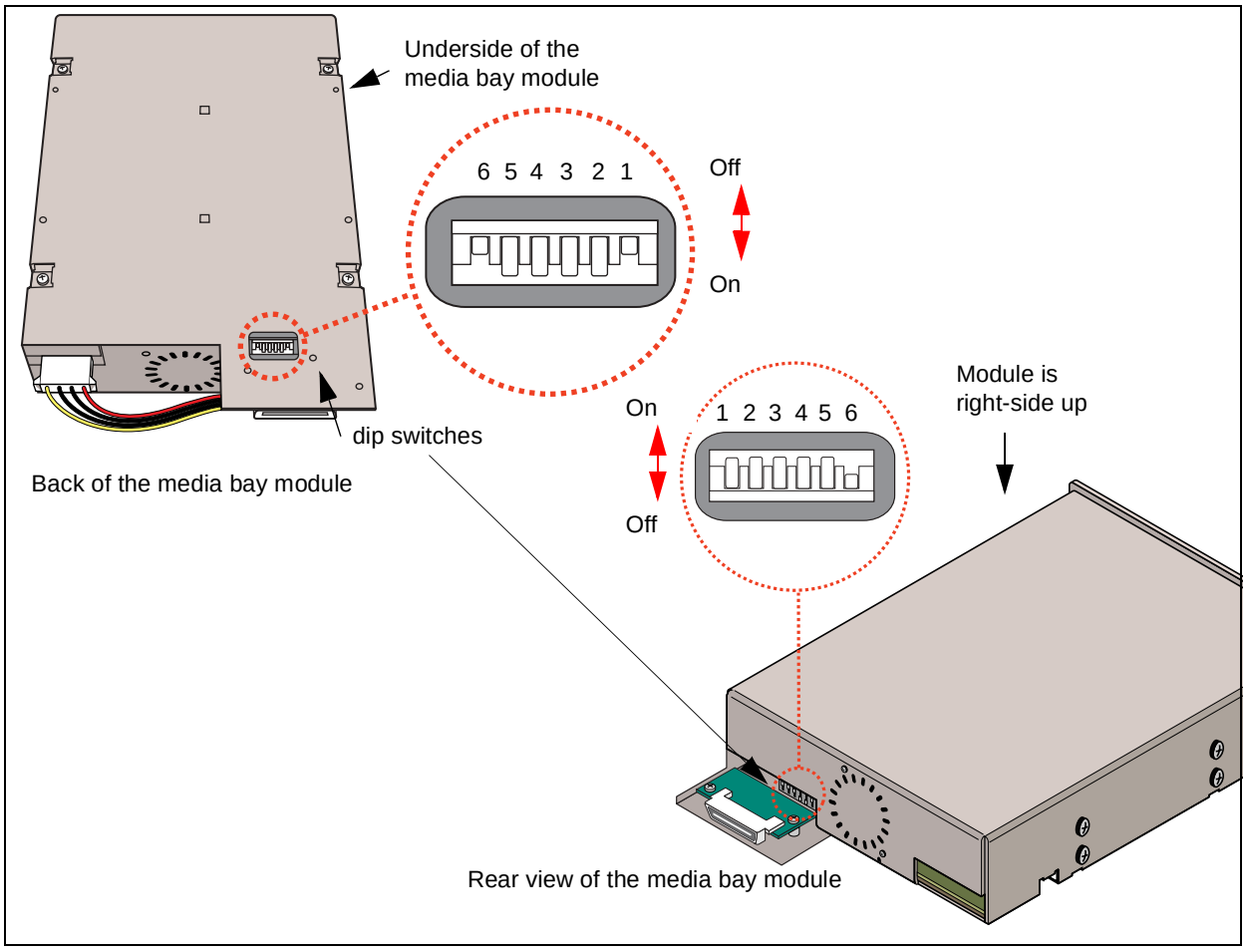


## Media bay module dip switches

The six dip switches that you use to set the DS30 channels and offsets are found either on the bottom of the module or on the rear, behind the power connector. Figure 40 shows the possible locations of the dip switches on the modules.

For more information about setting dip switches, refer to Chapter 4, “Install, Remove, or Replace the Media Bay Modules,” on page 117.

**Figure 40** dip switch positions on the modules



## Trunk Media Bay Modules

You install the trunk media bay modules in the Business Communications Manager or the Business Communications Manager expansion unit. The BCM200 holds a maximum of two media bay modules. The BCM400 holds a maximum of four media bay modules. The expansion unit holds a maximum of six media bay modules.

Trunk media bay modules connect telecommunications lines to the Business Communications Manager system.

These are determined by:

- which lines are available from your telephone service provider
- what lines you require for the types of telephones you want to use
- budget considerations

Table 9 lists the types of trunk media bay modules that are available for the Business Communications Manager system:

**Table 9** Trunk media bay modules

| Module type | What it does | Special notes |
|---|---|---|
| DTM<br>"Digital trunk media bay module" | Connects digital public switched telephone lines to the Business Communications Manager system. | Can connect to four types of lines: TI, NA PRI, ETSI (in UK only), and Euro PRI. |
| CTM4<br>"Caller ID trunk media bay module"<br><br>CTM8<br>"Caller ID trunk media bay module" | Connects a maximum of four analog public switched telephone lines to the Business Communications Manager system.<br><br>Connects a maximum of eight analog public switched telephone lines to the Business Communications Manager system. | Only available for North American systems. |
| BRI<br>"Basic rate interface (BRI) media bay module" | Connects a maximum of four ISDN BRI S/T interfaces | **Note:** The DECT module contains the equivalent of a BRI module and does not require a separate module for trunk line functions. |
| GATM4/GATM8<br>"Global Analog Trunk Module (GATM)" | Connects either four (GATM4) or eight (GATM8) analog public switched telephone lines to the Business Communications Manager system. | Only North America, UK and Australia support the dip switch firmware |

## Digital trunk media bay module

The Digital Trunk media bay module (DTM) connects to standard digital PSTN T1/fT1, E1/fE1 or PRI ISDN line using either a digital or PRI line. The DTM also supports DASS2, DPN22, Q.SIG and MCDN over ISDN.

- On North American Business Communications Manager systems, the DTM connects to a T1 or PRI line. With a T1 line, you can add a maximum of 24 digital telephone lines. With a PRI line, you can add a maximum of 23 digital telephone lines.
- On International Business Communications Manager systems, the DTM connects to an ETSI or PRI digital line. With an ETSI or PRI line, you can add a maximum of 30 digital telephone lines.

The front bezel of the DTM has a RJ48C connector that connects the DTM to the service provider connection point. The faceplate also has a set of loopback connectors you can use to run loopback tests. For details on loopback tests, refer to the *Business Communications Manager 2.5, Programming Operations Guide*. Figure 41 shows the DTM module interfaces.

**Figure 41** Digital Trunk Interface Module (DTM) faceplate LEDs and connectors

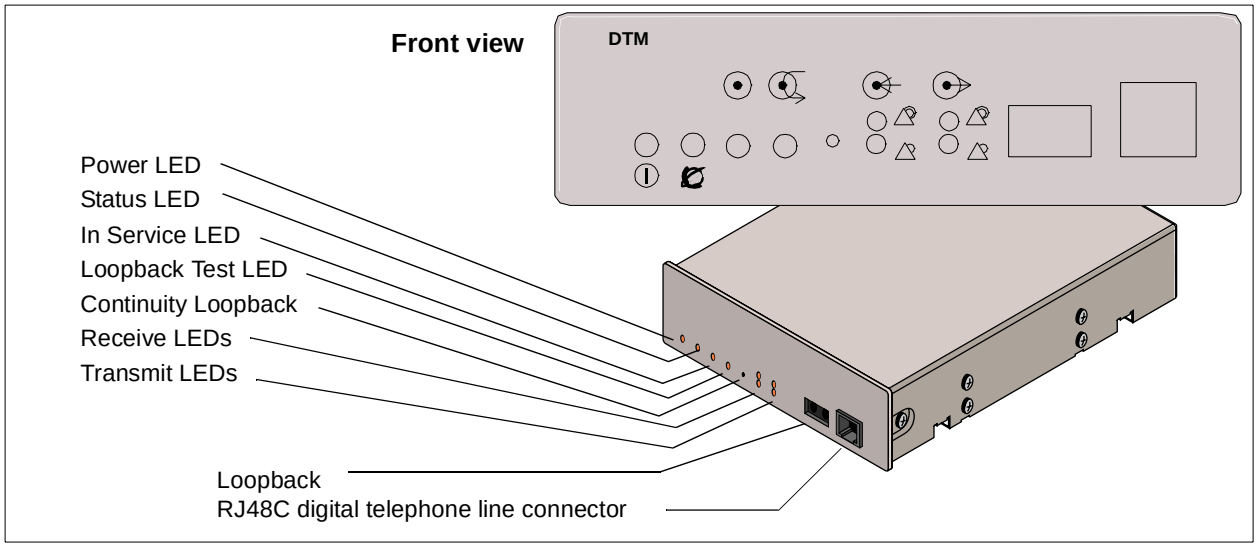



Table 10 provides a description of the function for each DTM LEDs.

**Table 10** DTM LED functions

| LED label | Function |
|---|---|
| (Power) | On indicates that the DTM is receiving power. |
| (Status) | On indicates there is data communication between the DTM and the MSC card. |
| In Service | Flashing indicates that the T1, ETSI or PRI trunks are out of service because a loopback test is running or the DTM is initializing. |
| Loopback | On indicates a continuity loopback test is running. |

**Table 10** DTM LED functions (Continued)

| LED label | Function |
|---|---|
| Receive Alarm | On indicates a problem with the received digital transmission. This half-duplex link does not work. |
| Receive Error | On indicates a small error as a result of degraded digital transmission. Possible causes are an ohmic connection, water ingress, or too long a loop. |
| Transmit Alarm | On indicates the DTM cannot transmit. The DTM sends an Alarm indication signal (AIS) to the terminating switch. This half-duplex link does not work. |
| Transmit Error | On indicates the DTM is sending a remote alarm indication (RAI) carrier failure alarm (CFA) to the terminating switch. If the Transmit Alarm is not on, this error indicates a far-end or cable problem. |
| All LEDS flashing | All LEDs flashing continuously indicates that the DTM is initializing. |

**TIP:** You can install a maximum of three DTM modules in the Business Communications Manager system, depending on the available channels.

## Caller ID trunk media bay module

**(North American systems only)**

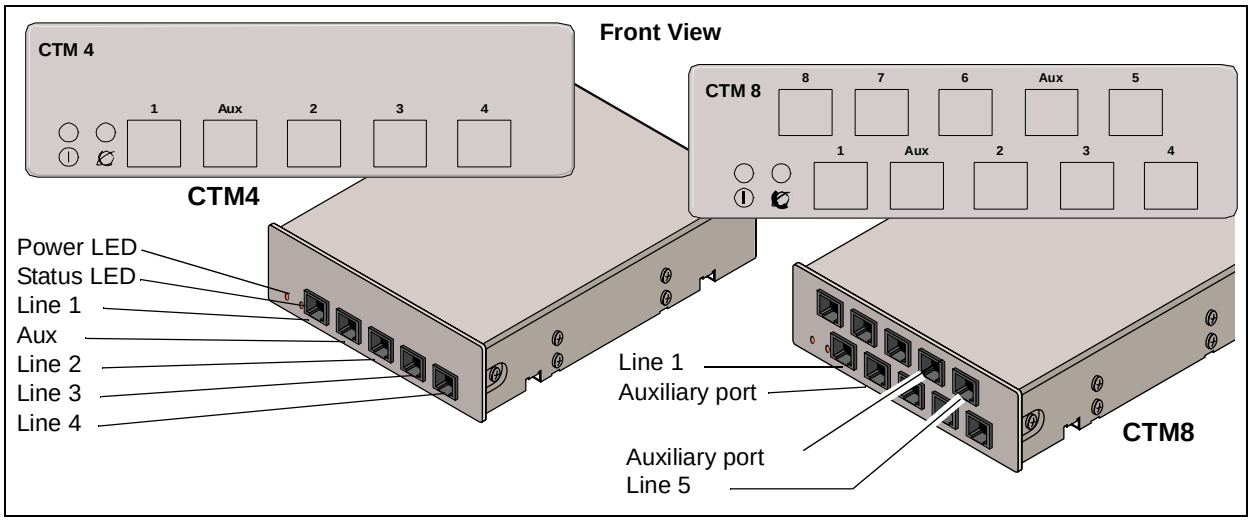
There are two types of Caller ID trunk media (CTM) bay modules:

- The CTM4 connects a maximum of four analog calling line ID (CLID) interfaces to the Business Communications Manager system via four RJ11 jacks on the module face. These jacks are labeled: Line 1, Auxiliary, Line 2, Line 3, and Line 4. The auxiliary jack connects to Line 1.
- The CTM8 provides eight analog CLID interfaces to the Business Communications Manager via eight RJ11 jacks on the module face. Each jack also supports disconnect supervision. There are two auxiliary jacks on this module which connect to Line 1 and Line 5.

The auxiliary ports allow you to connect of a V.90 modem, FAX machine, or analog analog telephone. When the auxiliary device is active, the Business Communications Manager system disables the associated line. Conversely, when the line is active, the auxiliary port line is disabled. When you connect a analog telephone to the auxiliary port, you can use it as an emergency telephone because this line remains active if a power outage occurs.

Figure 42 shows a view of the front of the CTM4 and CTM8.

**Figure 42** CTM4 and CTM8 module faceplate LEDS and connectors

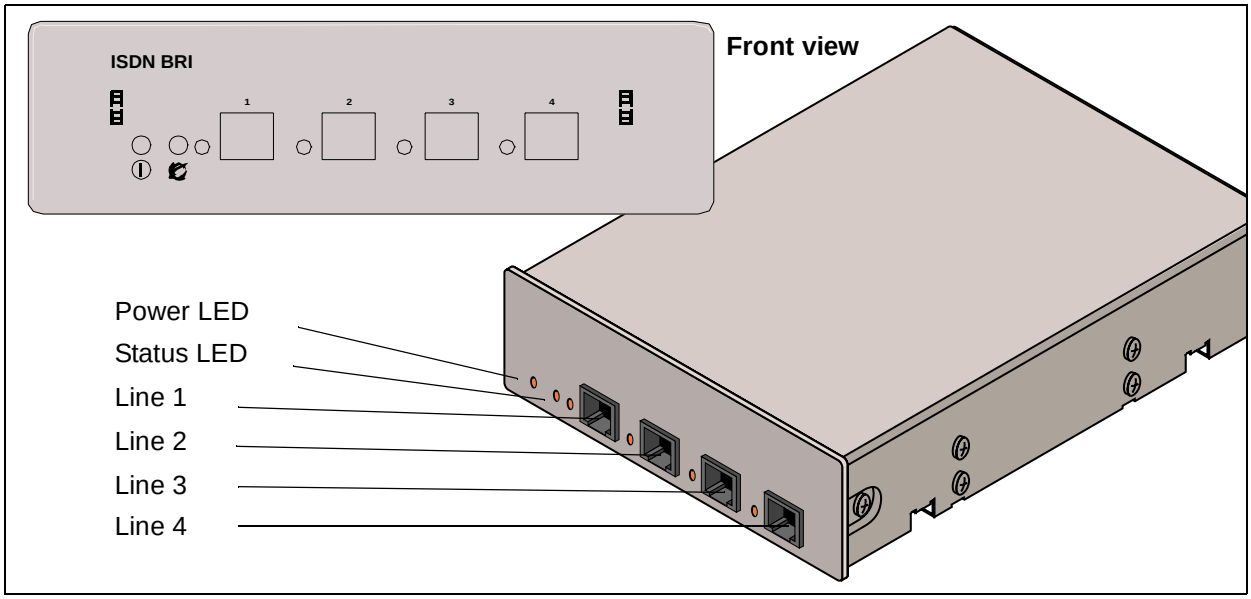



## Basic rate interface (BRI) media bay module

The basic rate interface media bay module (BRIM S/T) module connects a maximum of four BRI ISDN lines to the Business Communications Manager system. European systems use an S interface. North American-based systems use a T interface with an external NTI line.

Each BRI ISDN line you connect adds two telephone lines to the Business Communications Manager system. Therefore, each BRIM S/T adds a maximum of eight telephone lines to the Business Communications Manager system through the four RJ48C jacks on the faceplate. You can also use this module for dial backup or dial-on-demand services for WAN connections. The LEDs beside each RJ-48C jack are on when the ISDN line is active. Figure 43 shows the BRI faceplate LEDs and connections.

**Figure 43** BRIM S/T module faceplate LEDs and connectors



## Global Analog Trunk Module (GATM)

The Global Analog Trunk Module (GATM) provides an interface for four or eight analog central office lines. This module supports both pulse and tone dialing, as well as Caller ID and Supervision Disconnect in selected markets throughout the world. Contact your sales representative for specific market compatibility.

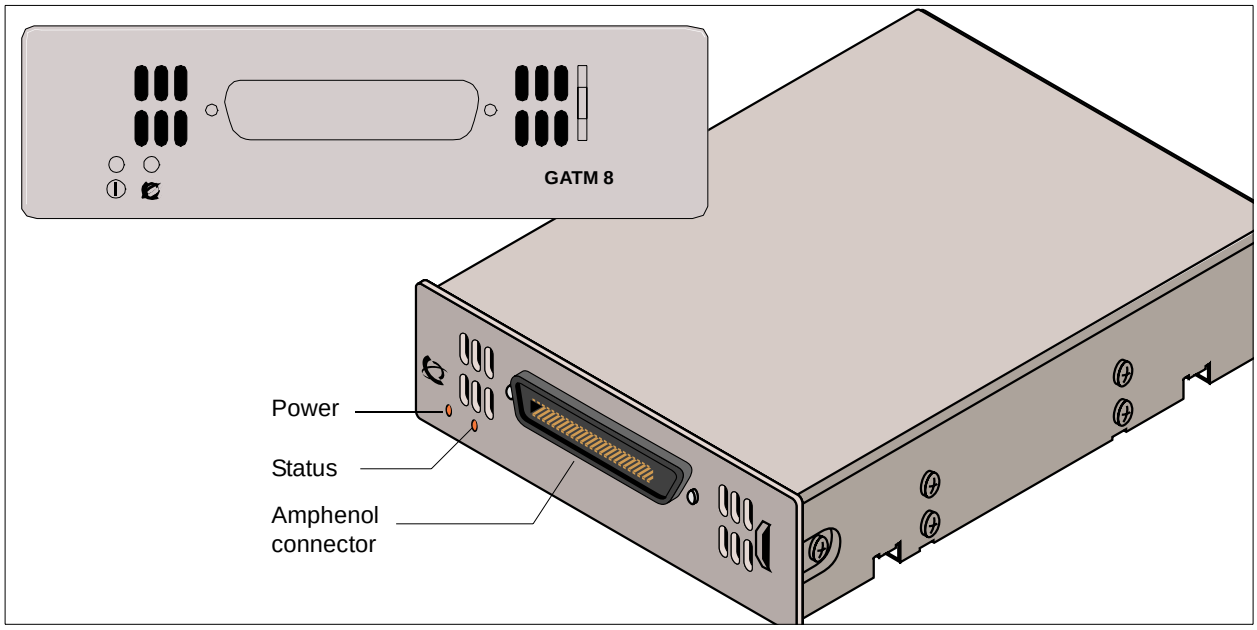
The GATM uses an amphenol connector as the trunk interface. Figure 44 shows the GATM faceplate LEDs and amphenol connector. The module is available either in four-port (GATM4) or eight-port (GATM8) configurations.

The GATM is capable of being used in either download mode or dip switch mode. The dip switches are located on the rear of the GATM module.

The download mode allows the module to download firmware from the Business Communications Manager system after system startup. In this mode, all the dip switches are set to 0 (zero). Download mode is only available for systems running BCM 3.5 and later software. For this release, you must be using the North America, United Kingdom (UK), Australia, or Taiwan market profiles. The factory default for this module is download mode.

Use the dip switch mode when you install the module in systems that use software prior to BCM 3.5. In this situation, you move the dip switches to positions that are specific for the North America, UK, Australia or Taiwan market profiles. Refer to "GATM switch settings" on page 140.

**Figure 44** GATM module faceplate LEDs and connectors



## Station Media Bay Modules

Install the station media bay modules in the Business Communications Manager or the Business Communications Manager expansion unit. Station media bay modules connect telephones and analog telecommunication devices to the Business Communications Manager system.

Table 11 provides a list of the station modules available by region:

**Table 11** Station module regional availability

| Module type | What it does | Availability |
|---|---|---|
| DSM 16+<br>"Digital station media bay module (DSM)"<br><br>DSM 32+<br>"Digital station media bay module (DSM)" | Connects a maximum of 16 digital telephones<br><br>Connects a maximum of 32 digital telephones to the Business Communications Manager system. | |
| 4X16<br>Combination 4-line CTM and DSM16 (4x16) Media Bay Module<br>"4x16 media bay module" | Connects a maximum of four CLID lines for a maximum of 16 digital telephones | Only available for North American systems. This module can be combined with CTMs on the same DS30 channel. |
| ASM 8<br>"Analog station media bay modules" | Connects a maximum of eight analog devices to the Business Communications Manager system. | Only available for North American systems.<br>You can add a maximum of two ASMs to your system. |
| ASM 8+<br>"Analog station media bay modules" | Connects a maximum of eight analog devices to the Business Communications Manager system. This module provideds caller ID, pass through, message waiting indication, and direct supervision at the telephone. This module also allows you to download new firmware. | Available for North American and United Kingdom systems.<br>You can add a maximum of two ASMs to your system. |

### Digital station media bay module (DSM)

Three types of media bay modules support digital telephones on the Business Communications Manager. This section describes the DSM 16+ and DSM 32+ modules (refer to Figure 45 on page 82).

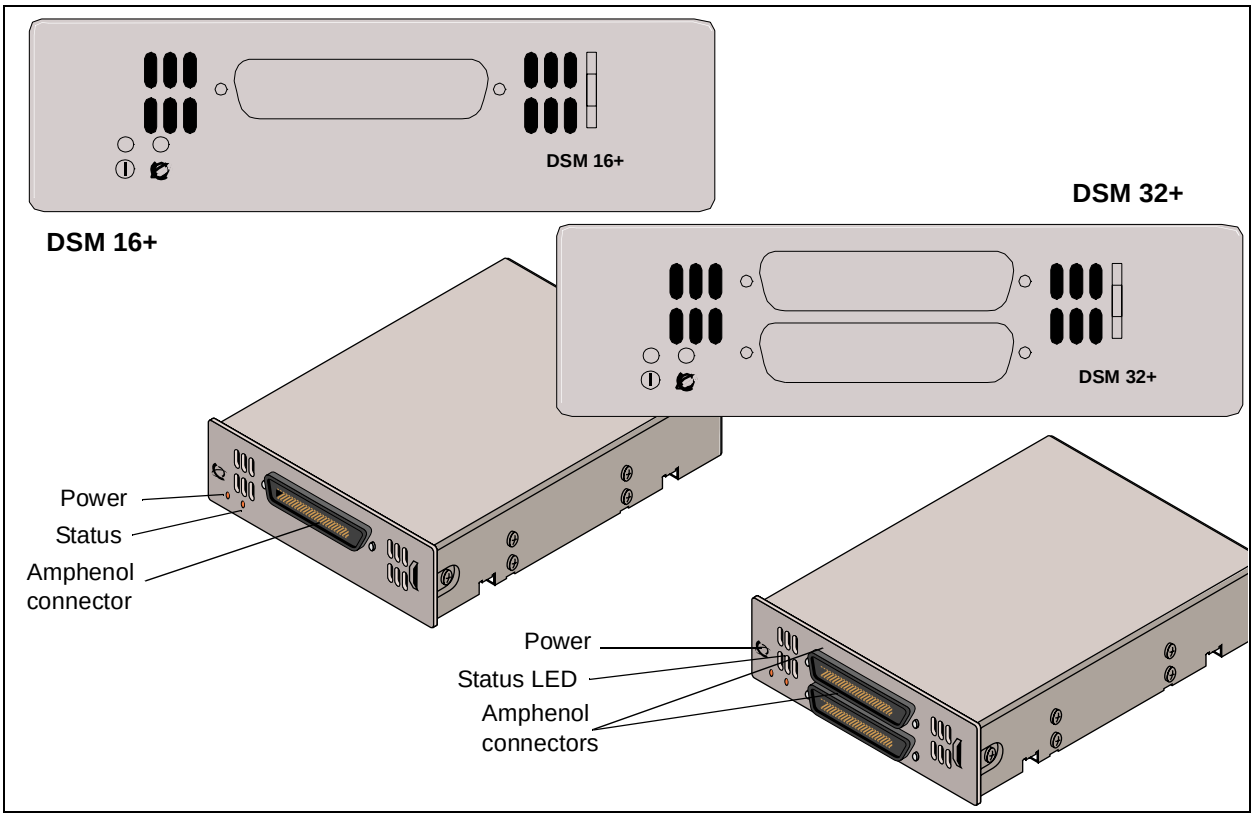
- Digital Station media bay module (DSM 16+) supports 16 digital telephones. Set the full double density (FDD) switch to enable the module to carry 16 extensions over a half DS30 channel. If required, install a second DSM 16+ and set the FDD switch to occupy the second half of the DS30 channel (setting the FDD switch) to expand the number of extensions to 32.

- Digital Station media bay module (DSM 32+) supports 32 digital telephones through two amphenol connectors. A DSM 32+ operating in single-density mode occupies two DS30 channels. Set the full double-density (FDD) switch to enable the module to carry 32 extensions over a single DS30 channel.

**Note:** Devices that share a DS30 channel must be identical. Use two DSM 16+ modules in FDD mode on a single DS30 channel. Do not mix a DSM 16+ with a DSM 32+ over a single DS30 channel.

- 4X16 supports 16 digital telephones and does not require a separate trunk module. Refer to "4x16 media bay module" on page 82.

**Figure 45** DSM 16+ and DSM 32+ module faceplate LEDs and connectors



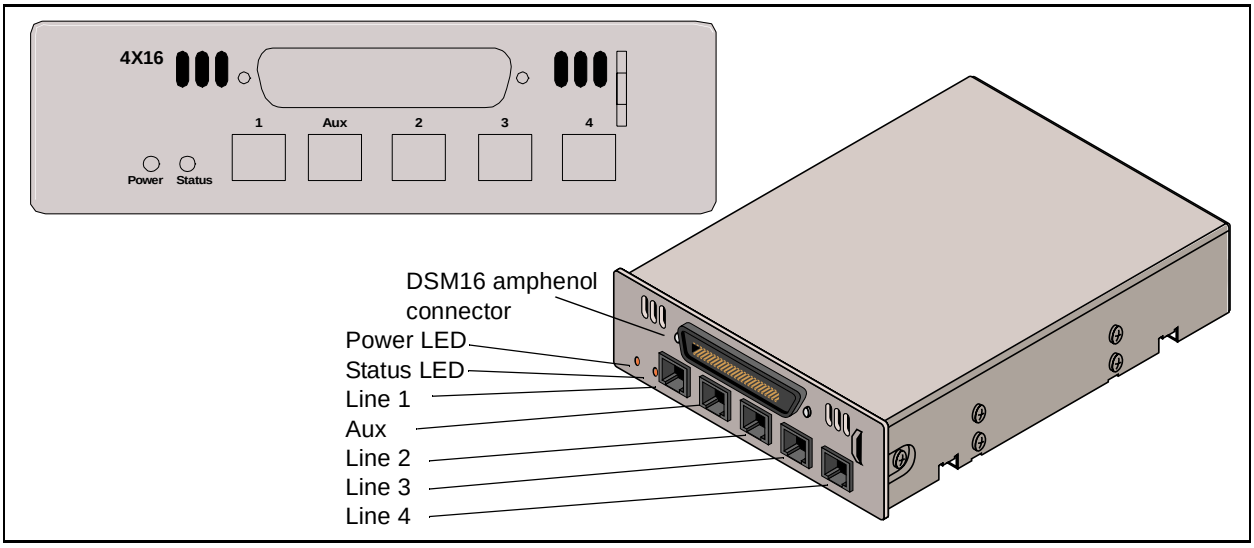

## 4x16 media bay module

## (North American systems only)

The 4x16 provides both analog trunk connections and connections to digital telephones. The module combines a CTM4 media bay module, with four analog lines, and a DSM 16-line digital telephone media bay module. Each of the four ports support Caller ID and disconnect supervision. An auxiliary port beside Line 1 allows you to use an analog telephony device, such as a modem, fax or telephone, to share the trunk.

Figure 46 shows a diagram of the 4x16. The 4x16 has one amphenol connector and five RJ11 connectors on the faceplate. For details on the 4x16 wiring, refer to Chapter 13, "Install Analog Terminal Adapters (ATA)," on page 355.

**Figure 46** 4X16 module faceplate LEDS and connectors




## Analog station media bay modules

## (North American and United Kingdom systems)

The analog station (ASM 8 [North America only] and ASM 8+) media bay modules (MBMs) can connect to eight analog telecommunication devices. These devices can be standard analog telephones, cordless telephones, FAX machines, answering machines, or modems. The maximum speed for a modem connection is 28.8 kbit/s.

In addition to ASM 8 features, the ASM 8+ module also offers the following features:

- Visual Message Waiting Indicator (VMWI): LED indicates to the end user that a message is waiting
- Disconnect indicator: indicates to the end user, in an established communication, that the caller has released the call.
- Caller ID: indicates to the end user at the start of the call the name, phone number and other information about the caller
- Firmware downloading capability: allows the core to upgrade the ASM 8+ firmware at customer sites
- Enhanced ringing capability
- Calling line identification (CLID)

The ASM 8+ module also supports off-premises extensions (OPX).

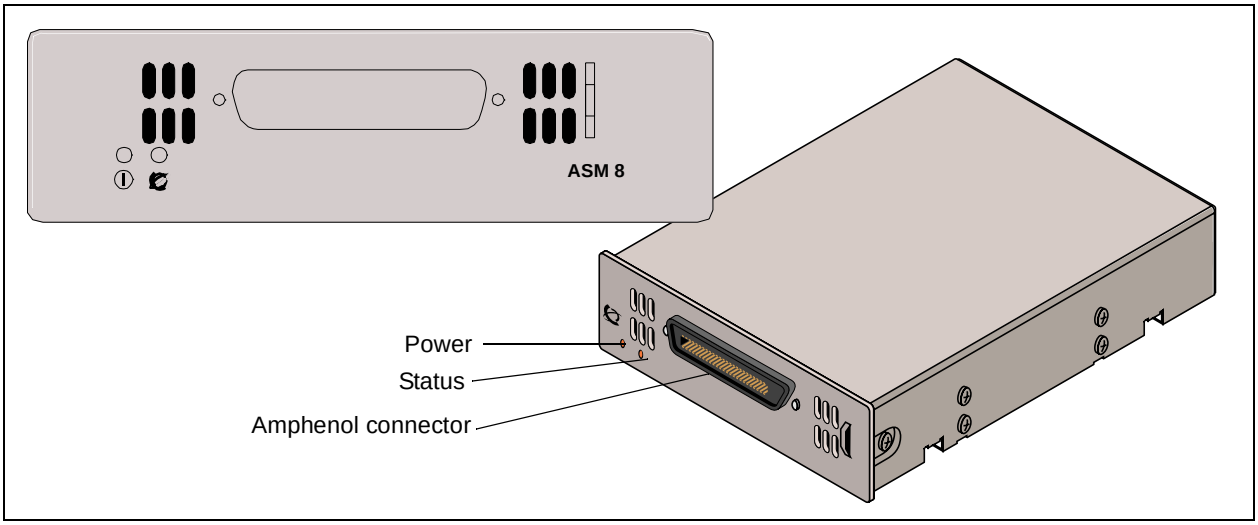
Figure 47 shows a diagram of the ASM 8. The ASM 8 has one amphenol connector on the faceplate. The ASM 8+ module is similar to the ASM 8, also with one amphenol connector. The ringer equivalency number (REN) (per port) for ASM 8 is 1; the REN for ASM 8+ is 2. For details about wiring the ASM 8 or ASM 8+, refer to Chapter 4, “Install, Remove, or Replace the Media Bay Modules’.

**Note:** The termination of the analog interface can consist of any combination of devices, subject only to the requirement that the sum of the RENs of all the devices does not exceed the REN of the interface to which the device is connected.

**Table 12** ASM 8 and ASM 8+ analog device specifications

| Specification | ASM 8 | ASM 8+ |
|---|---|---|
| Ringing frequency (North America) | 20 Hz +/- 1 Hz | 20 Hz +/- 1 Hz |
| Ringing frequency (Europe) | 25 Hz +/- 1 Hz | 25 Hz +/- 1 Hz |
| Ringing voltage (North America) | 65 V rms +/- 10% | 65 V rms +/- 10% |
| Ringing voltage (Europe) | 65 V rms +/- 10% | 65 V rms +/- 10% |
| Loop current | 20 mA minimum | 20 mA minimum |
| Battery feed voltage | -48 V dc +/- 10% | -29 V dc +/- 10% |
| FIC code | N/A | OL13B |
| Ringer equivalency number | 1 | 2 |
| Analog loop resistance on terminal side for voice applications (cable only) | 250 ohms (1538 m o 0.5 mm wire or 5000 ft of 24 AWG wire) | 200 ohms (1231 m o 0.5 mm wire or 4000 ft of 24 AWG wire) |
| Input impedance at tip and ring | 600 ohms | 600 ohms |
| Return loss | > 20 dB for 200 to 3400 Hz (when terminated with 600 ohms) | > 20 dB for 200 to 3400 Hz (when terminated with 600 ohms) |
| Insertion loss on an internal call | ATA2 to BCM loss 3.0 dB +/- 0.5 dB | ATA2 to BCM loss 3.0 dB +/- 0.5 dB |
| Insertion loss on an external call | Norstar ASM to BCM loss 3.0 dB +/- 1.0 dB; BCM to Norstar ASM loss 0.5 dB +/- 1.0 dB | Norstar ASM to BCM loss 3.0 dB +/- 1.0 dB; BCM to Norstar ASM loss 0.5 dB +/- 1.0 dB |

**Figure 47** ASM 8 module faceplate LEDs and connectors



## Specialized media bay modules

This section describes the modules that perform a specific job outside of the trunk and station module descriptions. Refer to Table 13.

- The Digital Enhanced Cordless Telecommunications (DECT) module allows you to add radio-based cordless communication devices to your Business Communications Manager in areas where the DECT technology is available.
- The Fiber Expansion module (FEM), provides a fast way of upgrading from an existing Norstar system simply by plugging in Norstar expansion modules to the FEM box.

**Table 13** Specialized modules

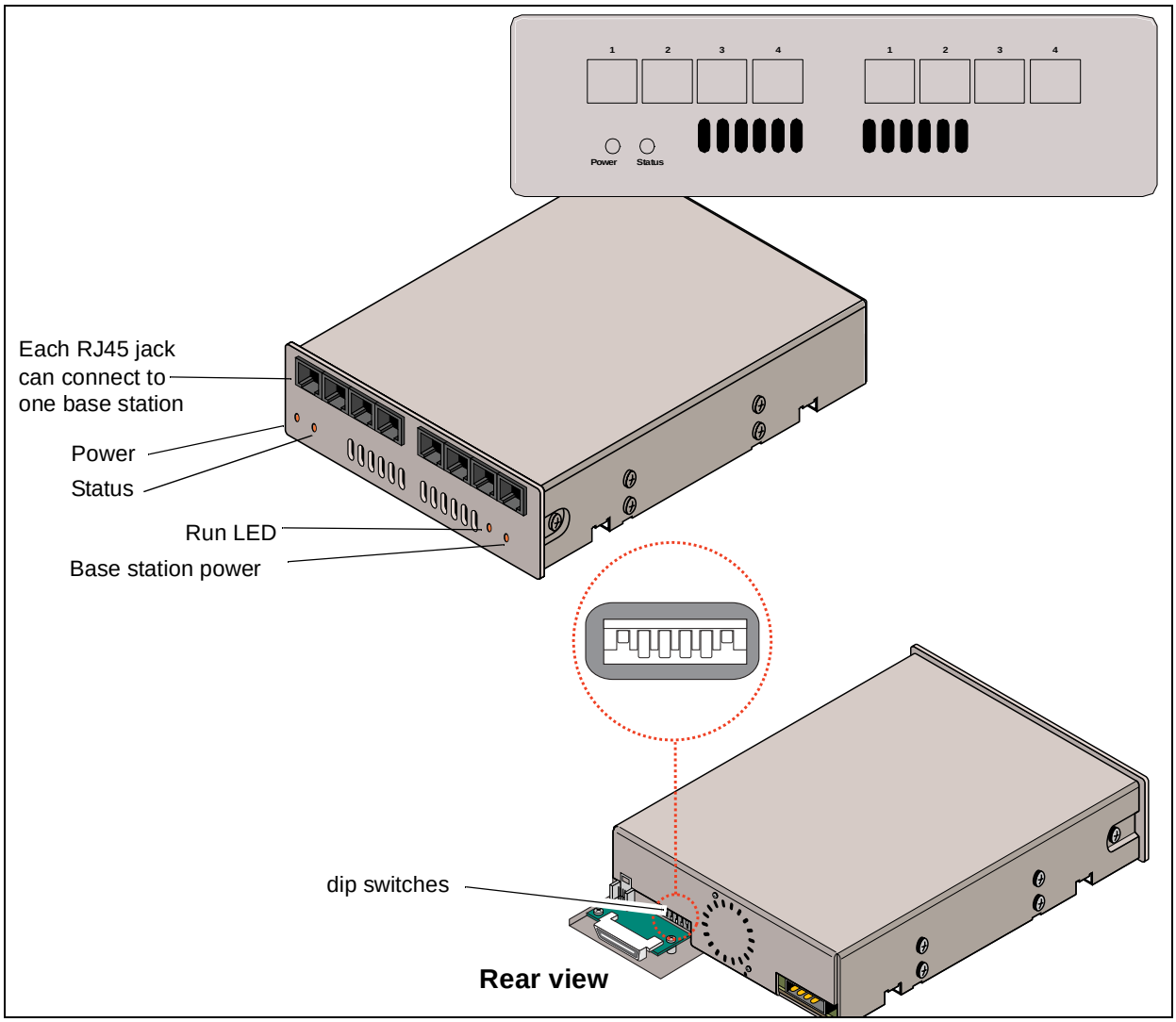
| Module type | What it does | Special notes |
|---|---|---|
| DECT<br>"Digital enhanced cordless telecommunications (DECT) media bay module" | connects a maximum of eight radio base stations which receives transmissions from registered cordless handsets (a maximum of 32). | Refer to "Regional mobility services" on page 400. |
| FEM<br>"Fiber expansion media bay module (FEM)" | connects a maximum of six Norstar expansion modules | The switches on the FEM are used to turn fiber ports on and off. The FEM does not work correctly if you set these switches using the rules used for other media bay modules. |
| DDIM<br>"Digital drop and insert MUX (DDIM)" | enables a Business Communications Manager system to share its connection to a Universal T1 network with a LAN | |

## Digital enhanced cordless telecommunications (DECT) media bay module (region-specific application)

The Digital Enhanced Cordless Telecommunications (DECT) module allows radio-based cordless handsets to access systems that are configured to accept the DECT profile. The module connects to radio base stations, which receive and transmit signals to the handsets. Refer to "Regional mobility services" on page 400 to determine the profiles that can use the DECT protocol.

Figure 48 shows a front view of the module. The DECT media bay module has eight RJ45 jacks that connect to base stations deployed around the coverage area. Each DECT module supports four ISDN lines and allows a maximum of eight simultaneous call paths back to the Business Communications Manager. The DECT module LEDs indicate module power, status, run state, and base station power state. The figure also shows the location of the dip switches on the DECT module. Refer to "DECT switch settings" on page 149 for the switch settings required for the module.

**Figure 48** DECT module faceplate LEDs and connectors



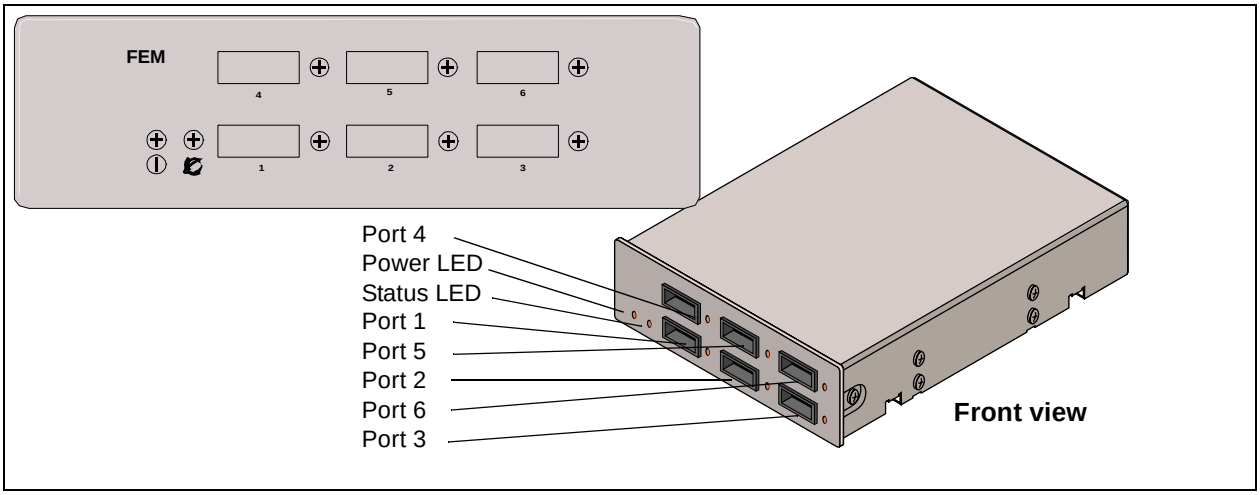
## Fiber expansion media bay module (FEM)

The Fiber Expansion media bay module (FEM) connects a maximum of six Norstar expansion modules to the Business Communications Manager system. These connections provide a quick way to upgrade a Norstar system to a Business Communications Manager system.

The front bezel of the FEM has six connectors. These connections are made using fiber cables between the FEM module and the Norstar expansion modules. Beside each connector, an LED lights when the fiber port is enabled.

The module has port status LEDs beside each port, as well as the usual power and status LEDs. Figure 49 shows the front of the FEM module. Each enabled port consumes one DS30 channel.

**Figure 49** Fiber expansion module (FEM) faceplate LEDs and connectors



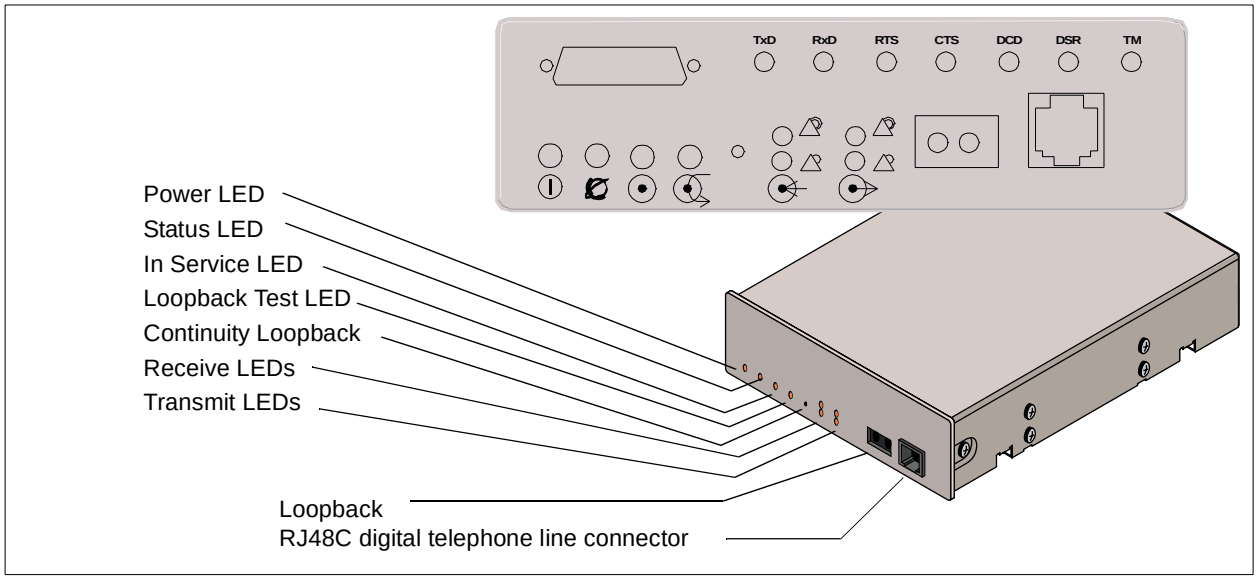

## Digital drop and insert MUX (DDIM)

The digital drop and insert MUX (DDIM) module enables a Business Communications Manager system to share its connection to a universal T1 network with a local area network (LAN) to provide a combination of voice and data channels.

The DDI MUX:

- provides the functionality of a DTM media bay module (T1 digital lines only)
- splits the incoming T1 line so that some of the lines are used for voice traffic and some of the lines are used for data traffic
- provides either the (Channel Service Unit) CSU or (Data Service Unit) DSU functionality to support connections to data terminal equipment (DTE), such as a router or a bridge
- connects to network devices that supportV.35 interfaces
- provides end-to-end transparent bit service
- supports loopbacks between the Enterprise Edge and the internal Business Communications Manager components, and between the Enterprise Edge and digital terminal equipment

**Figure 50** Digital drop and insert (DDIM) faceplate LEDs and connectors



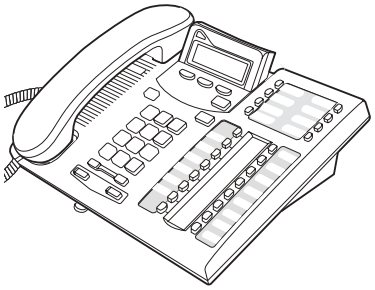
# Telephones and adapters

The following telephones and devices can be used with the Business Communications Manager system.

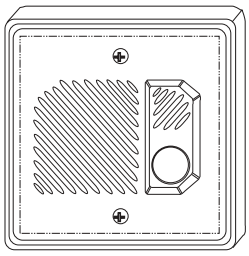
**Business Series Terminal T7100** — one-line display, one memory button without indicator.

**T7000 (not shown)** (International only) — four memory buttons, without display or indicators.

**Business Series Terminal T7208** — one-line display, eight memory buttons with indicators

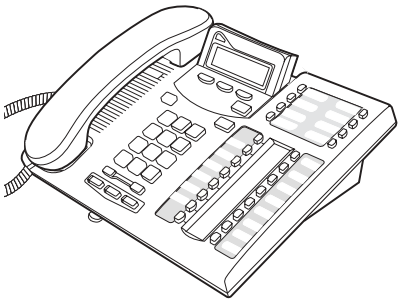


**Business Series Terminal T7316** — two-line display, three display buttons, 16 memory buttons with indicators, eight memory buttons without indicators. Supports separate mute key and a headset key under the dial pad.

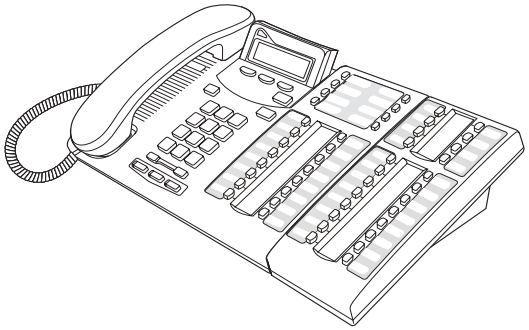


**Business Series Terminal (BST) Doorphone**

The BST Doorphone is used as an intercom device to control access to your building. It provides call notification and handsfree communication from a site entry location to assigned telephones on the Business Communications Manager system.



**Business Series Terminal T7316E** — two-line display, three display buttons, 16 memory buttons with indicators, eight memory buttons without indicators. Handsfree, mute, and headset buttons are located under the dial pad. The default button assignment is the same as the T7316 when the T7316E is installed on a system running software previous to BCM 3.5 software. The default button assignment is different than the T7316 when the T7316E is installed on a system running BCM 3.5 or later software.



**Business Series Terminal T7316E + Key Indicator Module (KIM)** — all the features of the T7316E plus 24 extra memory buttons with icons, per KIM. Can be configured as an enhanced Central Answering Position (CAP) that supports line and hunt group appearances the eKIMs, as an ordinary CAP that only supports memory button programming on the OKIMs. Supports a maximum of four eKIMs and up to nine OKIMS.

**i2004 IP telephone** — connects through an internet link to the Business Communications Manager. 6-line text display with a row of display keys on the 8th display line. Six memory keys with indicators. It can be used to call through VoIP or PBX lines.

Not shown: i2001, i2002 IP telephones, and i2050 Software Phone.

**Audio Conference Unit** (ACU)— provides large-room audio conferencing. The keypad provides many of the set features of the basic Norstar M-series telephones without display or memory buttons. This set comes with three microphones. Installation instructions are provided by the vendor.

**Mobility options**

**Companion** (region-specific) — provides twinning capability between a stationary set and a wireless mobile set. These handsets communicate through a stationary base station, which is wired to a digital station media bay module on the Business Communications Manager. Depending on your system configuration, you can have up to 64 sets assigned to your system. For installation instructions, refer to "Companion Hardware Installation" on page 327.

Provides two-line display, but no line, memory or display buttons. The handset accesses a restricted set of system features.

**T7406 Cordless Telephone system** — provides cordless mobility in a small office environment. Each base station supports three telephones. Function is based on the T7316/M7310 telephone. The base station connects to a digital station media bay module on the system.

Provides six memory buttons with indicators and a two-line display with three display buttons.

For installation instructions, refer to the *T7406 Cordless Telephone Installation Guide*.

**DECT** (region-specific) — provides cordless access to the system through a DECT media bay module. The cordless handsets can be twinned with a stationary set, or configured to act as an independent set. You can register up to 32 sets on a module. Each Business Communications Manager system, can support one DECT module.

Has display, but no line, display or memory buttons and has access to a restricted list of system features.

For base station installation and handset registration instructions, refer to the *DECT Installation and Maintenance Guide*.

**Symbol® NetVision and NetVision Data telephones** — H.323+ based IP telephones provide eMobility access through a LAN/WAN connection via a wireless access point. A display menu provides access to user and call feature.

Provides multi-line display capability, but no line, memory or display buttons.

**Accessories**

- **Station auxiliary power supply (SAPS)** — provides power for the Business Communications Manager central answering position (CAP) when the T7316E is connected to five or more OKIMs. Can also be used to extend the loop length between a telephone or terminal and the Business Communications Manager system from 1,000 to 2,600 feet. You must use a dedicated cable to connect the two locations.
- **Analog Terminal Adapter 2 (ATA 2)** — converts digital signals to analog signals to allow communication with analog devices such as FAX machines, modems and answering machines. The ATA 2 supports a maximum transmission rate of 28.8 kbit/s. With a single line telephone, the ATA 2 supports a long loop configuration. For more information, refer to Chapter 13, “Install Analog Terminal Adapters (ATA),” on page 355.

## Portable systems

The following sections describe the portable systems that are compatible with the Business Communications Manager system, and the hardware components that are required.

### Companion System Components

The Companion system allows portable access from a fixed line. The system consists of the following hardware components:

- **Companion base station:** transmits and receives signals between the Business Communications Manager system and portable handsets. You install the base stations on walls or ceilings. Each base station provides radio coverage for a maximum of 32 cells.

**Note:** Companion systems installed in the United States require a keycode to activate the base stations. Refer to “The Companion Wireless System” on page 325.

- **C3050 portable handset:** The C3050 CT2 Plus portable handset is available in Canada only. The Etiquette C3050 portable handset is available in the USA only. You can assign the C3050 Portable Handset a separate telephone number or the same telephone number as a desktop telephone. The C3050 supports basic features such as call forward, call transfer, conferencing and visual message waiting indication.
- **Remote power interconnect (RPI) Unit:** The RPI provides remote power for base station support. There are two types of RPIs: RPI-8 that supports a maximum of eight base stations and RPI-16 that supports a maximum of 16 base stations.

## DECT System Components

The DECT system allows the user to access calls and call features while away from their stationary telephone. The following components combine with the DECT media bay module to provide this service:

- **Radio base station:** provides the radio link between the Business Communications Manager, through the DECT module, to the portable handsets.
- **Portable handsets:** communicate through radio base stations connected to the DECT module.

**Note:**

The DECT cordless handset can be configured to act as a separate set, either providing a point for target line calls, or with full call and receive capability, although some of the features are not available.

The handset can also be twinned with desk sets to provide mobile coverage of one or more stationary sets.

DECT system installation and configuration information is contained in the *Business Communications Manager 3.0 DECT Installation and Maintenance Guide*.

## T7406 system components

The T7406 wireless system allows the user to access calls and call features while away from their desk. The following components provide this service:

- **Radio base station:** provides the radio link between the Business Communications Manager, through a station media bay module, to the portable handsets (three handsets per base station).
- **Portable handsets:** based on T7316/M7310 functionality, including six line buttons and a two-line display.

## NetVision system components

The NetVision and NetVision Data telephones provide an internet telephone connection to the Business Communications Manager. These eMobility wireless telephones are based on an enhanced implementation of H.323, referred to as H.323+, and IEEE 802.11 protocol for wireless LANs.

The NetVision system consists of the following components:

- **Access point:** provides the radio link between the NetVision telephones and an internet connection. This hardware is ordered separately, and comes with complete installation instructions. This component is not specific to Business Communications Manager.
- **Portable handset:** communicates through the internet to the Business Communications Manager. This handset is wireless. However, the access point through which it communications connects to the internet, therefore, the handset appears as an IP telephone to the Business Communications Manager.

- **Handset administration:** a Business Communications Manager running version 2.5, Feature Pack 1 or newer software, provides a link to the NetVision Phone Administrator (NVPA). This application, which is specific to the Business Communications Manager, resides on your computer. Handset administration provides a set of handset options where you specify the features and settings for each handset. This file is then uploaded by the handset through a serial cable from your computer.

The *Business Communications IP Telephony Configuration Guide* describes how to integrate this telephone into the Business Communications Manager system. Symbol provides a user manual that describes the handset-based features and how they work. The NetVision Telephone Feature Card, provided on your Business Communications Manager CD, describes how to use the Business Communications Manager features that can be accessed through the handset.

**Note:**
The NetVision handsets can be configured to act as a stand-alone telephone, either providing a point for target line calls, or with full call and receive capability, although some of the features are not available. It can also be twinned with stationary telephones to provide mobile coverage of one or more stationary telephones.
This handset has no memory buttons. Instead, a pre-programmed display menu provides access to Business Communications Manager features.

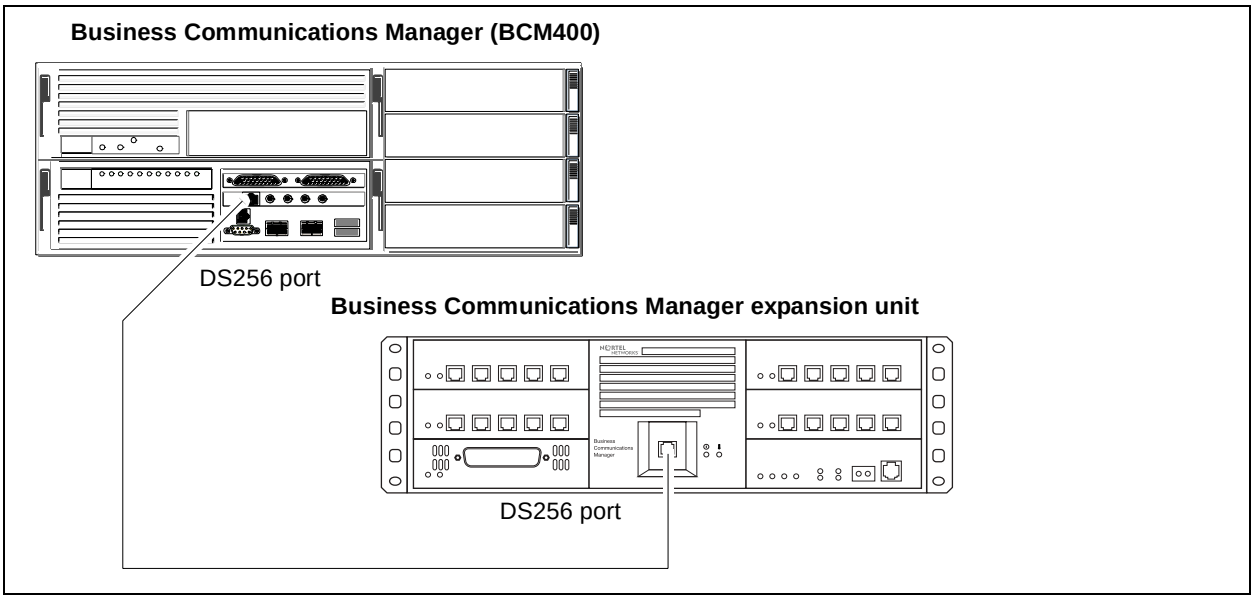
# Business Communications Manager Expansion Unit

The Business Communications Manager expansion unit contains six additional bays for media bay modules (MBMs). The Business Communications Manager expansion unit is available for use only with the BCM400.

The supplied DS256 cable is 5 m (16 ft.) long. Use of any other cable is not supported. The cable connects into a DS256 port on the MSC of the Business Communications Manager, and into a DS256 port on the center panel of the expansion unit. Refer to Figure 51.

**Note:** The number of modules that actually can be installed is determined by the number of DS30 channels required by the modules and the number of channels available. Refer to Chapter 3, “Install the Business Communications Manager and Expansion Unit Platform Base Chassis,” on page 107.

**Figure 51** Business communication manager DS256 connectors and expansion unit



# Chapter 2
# Auxilliary Requirements and Installation Process Overview

This chapter provides a description of the prerequisite computing platform and network specifications required to operate the Business Communications Manager Unified Manager software. This chapter also provides a summary of the installation process for the Business Communications Manager, telephony components, and Business Communications Manager expansion unit.

This chapter contains the following primary information:


- "Computer Prerequisites" on page 98
- "Workstation browser requirements" on page 98
- "Installation Process Overview" on page 100
- "Installation Preparation Checklist" on page 102
- "System Equipment and Supplies" on page 104


You require a personal computer to run the Business Communications Manager Unified Manager application. Use the Unified Manager application to configure and manage the Business Communications Manager system.

For administration purposes, you also require an network connection with the correct browser setup.

# Computer Prerequisites

This section contains information on workstation requirements needed to operate the Unified manager interface. Use the Unified Manager to perform maintenance and management functions on the Business Communications Manager. This section contains the following information:


- "Workstation browser requirements" on page 98
- "Preloading Java Class files on your workstation" on page 99
- "Optimizing Unified Manager speed" on page 99


The following are the minimum computer workstation specifications you need to run the Business Communications Manager Unified Manager:

- 133 MHz Pentium CPU (or compatible)
- 64 MB RAM
- 10 MB disk space available
- Screen resolution of 1024 x 768
- Monitor large enough to support the screen resolution (suggested size: 17 inches)
- Operating system: minimum—Windows 95/98, or NT, 2000, or the Millennium version

**Note:** The ideal display setting for a monitor using Unified Manager is 1280 x 1024.

Unified Manager is a web-based application that runs off the Business Communications Manager computer. Therefore, you take up minimal space on your computer and you can run multiple applications on your computer. We recommend that you use Windows NT or 2000 to ensure optimal performance with the Unified Manager.

## Workstation browser requirements

To use Business Communications Manager Unified Manager, you must have:

- Java Virtual Machine (JVM) 5.0 (build 5.0.0.3188 or greater)

  one of the following web browsers:

  — Netscape Communicator 4.5 or greater
  — Microsoft Internet Explorer 4.0 or greater

If you are using Netscape Communicator, set the following parameters:

- Enable Java: On
- Cached document comparison: Every time

If you are using Microsoft Internet Explorer, set the following parameters:

- Check for newer versions: Every visit to the page
- Java JIT compiler enabled: On

## Preloading Java Class files on your workstation

To preload Java Class files on your workstation:

1. Open Unified Manager from your desktop.

   The first window displays a number of functional buttons.

2. Click on the **Install Client** button.

3. From the list, choose the link to the Java Class for the browser you are using (Internet Explorer or Netscape Navigator).

   Two more Java Class links appear.

4. Click on the *Java Class* link that applies to your browser.

   A download wizard appears.

5. Follow the prompts on the wizard to download the Java Class files.

## Optimizing Unified Manager speed

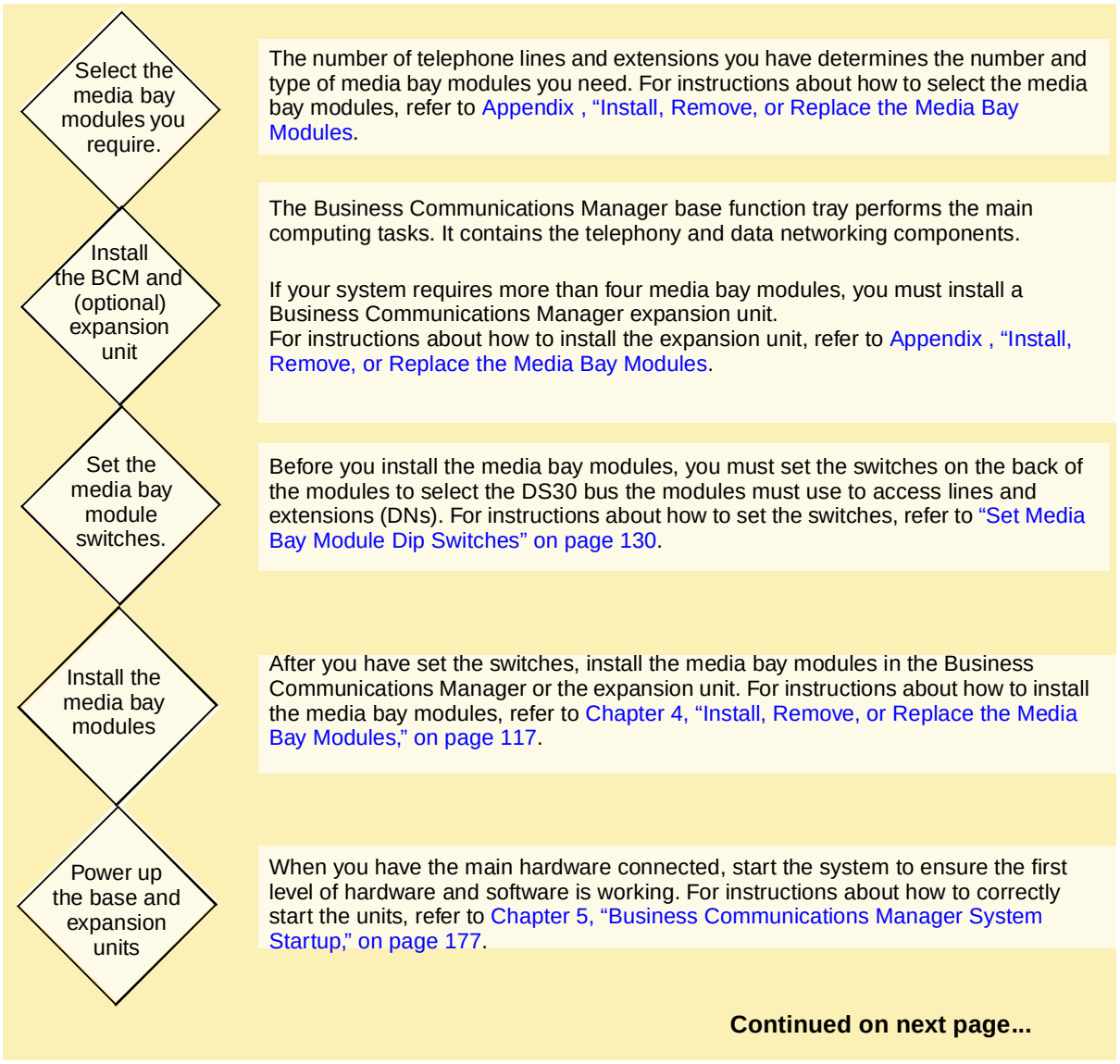
The following are a number of suggestions about how to ensure you have the optimal connection to your Unified Manager while you program or maintain your Business Communications System.

- Use the LAN, WAN, or serial port to connect to your computer and use the Unified Manager to perform configuration.
- If you run multiple operations on your computer, we recommend that you use Windows NT or 2000 to ensure optimal performance with the Unified Manager.
- If your computer is using Windows 95/98, the interaction can be slower if you attempt to run more than one application.

# Installation Process Overview

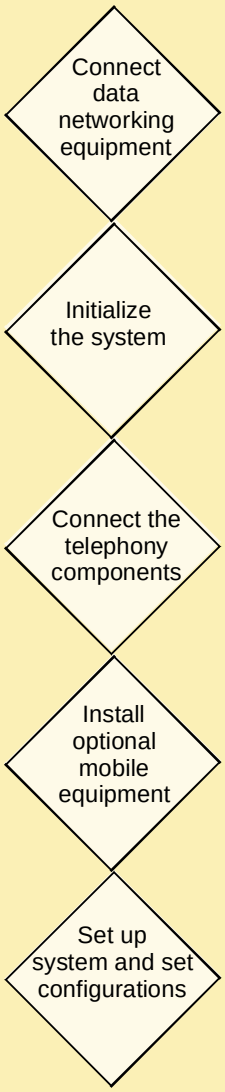
Figure 52 provides an overview of the installation process. Use the overview information as a quick reference to prepare the Business Communications Manager for installation. The overview information provides the correct installation sequence.

**Figure 52** Installation and initialization overview


Select the media bay modules you require.
The number of telephone lines and extensions you have determines the number and type of media bay modules you need. For instructions about how to select the media bay modules, refer to Appendix , “Install, Remove, or Replace the Media Bay Modules.
Install the BCM and (optional) expansion unit
The Business Communications Manager base function tray performs the main computing tasks. It contains the telephony and data networking components.
If your system requires more than four media bay modules, you must install a Business Communications Manager expansion unit.
For instructions about how to install the expansion unit, refer to Appendix , “Install, Remove, or Replace the Media Bay Modules.
Set the media bay module switches.
Before you install the media bay modules, you must set the switches on the back of the modules to select the DS30 bus the modules must use to access lines and extensions (DNs). For instructions about how to set the switches, refer to “Set Media Bay Module Dip Switches” on page 130.
Install the media bay modules
After you have set the switches, install the media bay modules in the Business Communications Manager or the expansion unit. For instructions about how to install the media bay modules, refer to Chapter 4, “Install, Remove, or Replace the Media Bay Modules,” on page 117.
Power up the base and expansion units
When you have the main hardware connected, start the system to ensure the first level of hardware and software is working. For instructions about how to correctly start the units, refer to Chapter 5, “Business Communications Manager System Startup,” on page 177.

**Continued on next page...**

**Installation overview, continued...**


Connect data networking equipment
Initialize the system
Connect the telephony components
Install optional mobile equipment
Set up system and set configurations

The data networking components of the Business Communications Manager system provide network connection to your local area network (LAN) and/or your wide area network (WAN). For instructions about how to install the data networking components, refer to "Connect the Data Networking Hardware" on page 180.

Systems are shipped with a default IP and subnet mask. You must change these settings to suit your system. Refer to "Initialize the System" on page 185, which also describes how to set up your computer to access the Quick Start Wizard, which you use to perform system configuration. Refer to the *Business Communications Manager 3.0 Programming Operations Guide* for details about the Quick Start Wizard.

The telephony components of the Business Communications Manager system provide call processing and connection to the public telephone system. For instructions about how to install telephones and components, refer to Chapter 13, "Install Analog Terminal Adapters (ATA)," on page 355 and Chapter 14, "Install Optional Telephony Equipment," on page 365.

The Companion system provides wireless service between mobile sets and stationary sets within the Business Communications Manager system.

The DECT module provides system connection for cordless handsets that can act as mobile sets or as standalone sets.

These applications are region-based. Refer to "Regional mobility services" on page 400.
For instructions about installing a Companion system, refer to Chapter 12, "Install Companion or DECT Systems," on page 325. The DECT module has a separate installation and maintenance guide.

Refer to the *Business Communications Manager 3.0 Programming Operations Guide* to set up basic telephony and data configurations.

Refer to the separate application guides to set up optional applications such as call management or voice over IP functions.

# Installation Preparation Checklist

This section provides information you need to know before you install the Business Communications Manager and contains the following information:


- "Environment Checklist" on page 102
- "Electrical Requirements" on page 103
- "Internal wiring requirements" on page 103


Before you install the base BCM platform base or expansion unit hardware, complete the following actions.

- Determine the location for the Business Communications Manager (or expansion unit), telephones, and other equipment based on spacing and electrical requirements. For more information about spacing and electrical requirements, refer to the "Environment Checklist" on page 102 and the "Electrical Requirements" on page 103.
- Order the required trunks from the central office.
- Check that all of the media bay modules are installed in the Business Communications Manager or expansion unit.
- Ensure that you have all the equipment and supplies you require to install the system.

## Environment Checklist

The installation area must be:

- minimum of 4 m (13 ft) from equipment such as photocopiers, electrical motors, and other equipment that produces electromagnetic, radio frequency, and electrostatic interference
- within 1.5 m (5 ft.) of a three-wire grounded electrical outlet
- clean, free of traffic and excess dust, dry, and well ventilated
- within the temperature ranges of 10°C and 40°C (50°F and 95°F)
- between 20% and 80% non-condensing relative humidity
- enough space and strength to support the Business Communications Manager
- minimum of 46 cm (18 in.) from the floor

**Note:** The installation area must be of sufficient height from the floor to prevent water damage.

## Electrical Requirements

The following electrical requirements must be met:

- Power must be supplied from a non-switched, unobstructed outlet within 1.5 m (5 ft.) of the Business Communications Manager or expansion unit.
- The supplied power must be a dedicated 110 V to 120 V ac nominal (or 220 V to 230 V ac nominal), 50/60 Hz, 15 A minimum service with a third wire safety ground. The third wire safety ground provides shock protection and avoids electromagnetic interference.

**Danger:** Risk of electric shock.

The safety of this product requires connection to an outlet with a third wire ground. Use only with a three wire power cord and outlet.

**Caution:** Check ground connections.

Ensure that the electrical ground connections of the power utility, telephone lines and internal metal water pipe system, if present, are connected together. If these ground connections are not connected together, contact the appropriate electrical inspection authority. Do not try to make the connections yourself.

The Business Communications Manager (or expansion unit) power cord is 1.5 m (5 ft) long. You can connect the power cord to a power bar with a maximum length of 2 m (6.5 ft), including power bar. You must use a power bar approved by an appropriate National Test Body, with a third wire ground. Do not use an extension cord between the platform base chassis and the power bar, or between the power bar and the electrical outlet.

The cable between the Business Communications Manager expansion unit and the Business Communications Manager is supplied with the expansion unit. Do not use any other cables or connectors.

## Internal wiring requirements

This section describes the requirements for a digital loop and an analog loop within the system.

### Digital loop

The following parameters must be met for a digital loop:

- one, two, or three twisted-pair cable(s) per telephone
- dc loop resistance of less than 64 Ω
- cable length (0.5 mm or 24 AWG) less than 300 m (975 ft.)
- use of a station auxiliary power supply (SAPS) for loops 300 m (975 ft.) to 1200 m (3900 ft.).
  In North America, the SAPS must be a CSA or UL approved Class 2 power source.
  In Europe, the SAPS must be a Class II power source and CE marked.
- no bridge taps

### Analog loop

The following parameters must be met for an analog loop.

- maximum dc loop resistance of 208 Ω
- maximum cable length (0.5 mm or 24 AWG) of 1220 m (4000 ft.)

# System Equipment and Supplies

This information in this section provides information on the equipment required to install the Business Communications Manager. This section contains the following information:


- "Basic hardware" on page 104
- "Optional equipment" on page 104
- "Companion equipment" on page 105
- "DECT Equipment" on page 105
- "Equipment for installing the platform base chassis" on page 106


Use the checklists in this section to ensure you have all the required equipment.

## Basic hardware

The Business Communications Manager system consists of some combination of the following hardware:

- Business Communications Manager system
- Business Communications Manager expansion unit
- media bay modules
- telephones
- cabling for connections between hardware units

You can place a maximum of two media bay modules (MBMs) in the BCM200 and four media bay modules in the BCM400 platform base chassis. Install and use an expansion unit (only with a BCM400 system) if you require more than four MBMs.

## Optional equipment

You can add the following equipment to the system to support specific requirements beyond the BCM platform base hardware:

- Station auxiliary power supply (SAPS)
- Central answering position (CAP or CAPN) module, to as many as five M7324 telephones in the system
- Business Communications Manager Analog Terminal Adapter 2 (ATA 2) if connecting analog equipment to a digital media bay station module

- Uninterruptable power supply (UPS) as a standalone device
- Analog emergency telephone
- WAN card field replaceable unit (FRU) if the Business Communications Manager base system requires connection to a WAN. There are two WAN card types available. The North America version has a T1 and v.35 interface. The international version has a x.21 and v.35 interface.
- Countries outside of North America must order separately, a power cord that conforms to their specific requirements or standards. All North American base and expansion systems are equipped with a North American power cord.

## Companion equipment

If you are installing a Companion system, check that you have the following hardware.

### C3050 CT2 Plus (Canada)

- base station kit
- handsets (C3050)
- battery packs (NiCad 600 mAh)
- high-capacity battery charger

### C3050 Etiquette (USA)

- base station kit
- handsets (C3050)
- battery packs (NiCad 600 mAh)
- high-capacity battery charger
- UTAM software keycode for base station activation

### Optional Companion equipment

- clip holster
- leather glove
- rugged protector
- headset, earbud (battery not included)
- headset, headband (battery not included)

### Other cordless systems

The DECT cordless system, T7406 cordless handset, and Symbol NetVision wireless IP handsets all have installation documentation specific to the installation of base stations and registration of the handsets to the Business Communications Manager.

## DECT Equipment

If you are installing a DECT system, check that you have the following hardware.

- DECT module
- base station kit
- handsets and rechargers

## Equipment for installing the platform base chassis

For the installation, you need the following equipment:

- rack mounting bracket
- four rubber feet
- Phillips screwdriver #2
- flat blade screwdriver
- pliers
- antistatic grounding strap
- connecting tool
- surge protector (recommended)
- cables, 25-pair cable with amphenol connectors

# Chapter 3
# Install the Business Communications Manager and Expansion Unit Platform Base Chassis

This chapter describes how to install the Business Communications Manager platform base chassis and expansion unit in your physical environment and contains the following primary information:


- "Install the Platform Base Chassis in a Rack" on page 107
- "Install the Platform Base Chassis on the Wall" on page 111
- "Install the Platform Base Chassis on a Flat Surface" on page 113
- "Install the Expansion Unit into a Rack" on page 113
- "Install the Expansion Unit on a Flat Surface" on page 115
- "Connect the Expansion Unit to the Business Communications Manager" on page 115


## Install the Platform Base Chassis in a Rack

This section provides information on how to install the Business Communications Manager in a server rack. This section contains the following information:


- "Attach the rack mounting brackets" on page 107
- "Mount the platform base chassis in an equipment rack" on page 109


The Business Communications Manager fits into a standard 19-inch equipment rack. You can install the platform base chassis in the same rack as your other networking and telecommunications equipment.

**Caution:** When installing the Business Communications Manager in a rack, do not stack units directly on top of one another in the rack.

Fasten each unit to the rack with the appropriate mounting brackets. Mounting brackets cannot support multiple units.

Refer to "Environment Checklist" on page 102 for acceptable environmental conditions before selecting a location for the Business Communications Manager.

**Caution:** For desk mount installations, do not place anything directly on top of the Business Communications Manager base platform chassis.

### Attach the rack mounting brackets

1. Place the Business Communications Manager on a flat, clean surface.
2. Align the screw holes between the Business Communications Manager platform base chassis and the right rack mounting bracket.

3 Fasten the bracket to the Business Communications Manager platform base chassis using four screws.

**Caution:** Only use the screws supplied with the rack mounting bracket. Do not replace screws. Other screws can damage the Business Communications Manager.

4 Align the screw holes between the Business Communications Manager platform base chassis and the left rack mounting bracket.

5 Fasten the bracket to the platform base chassis using four screws. Refer to Figure 54.

**Figure 53** Attach the rack mount bracket to the BCM200 chassis

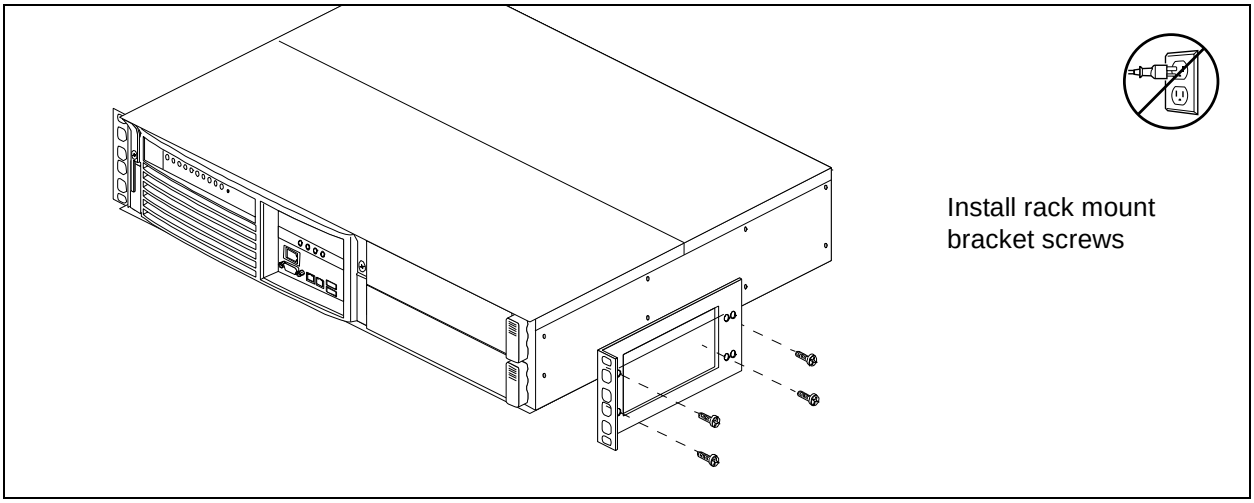
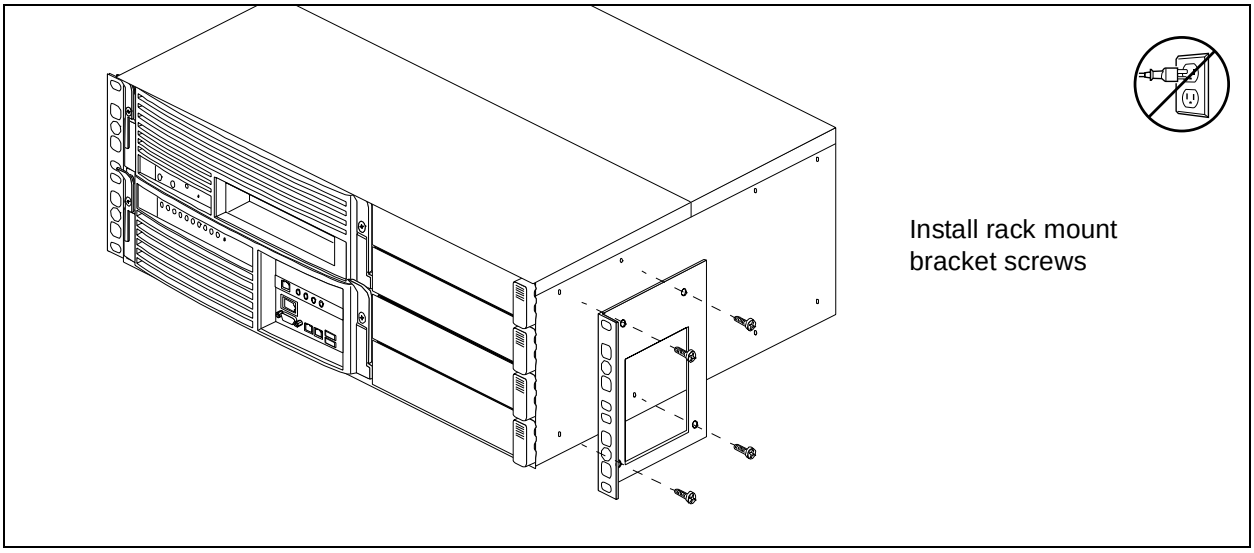



**Figure 54** Attach the rack mount bracket to the BCM400 chassis



## Mount the platform base chassis in an equipment rack

Use the procedure in this section to install the Business Communications Manager in an equipment rack.

1. Determine the location in the rack where you want to install the platform base chassis.
2. Position the unit in the rack. Have an assistant hold the platform base chassis.
3. Align the holes in the rack mounting bracket with the holes in the equipment rack rails.
4. Fasten the rack mounting brackets to the rack using four screws (supplied) (see Figure 55).

**Figure 55** Fasten the BCM200 platform base chassis to an equipment rack

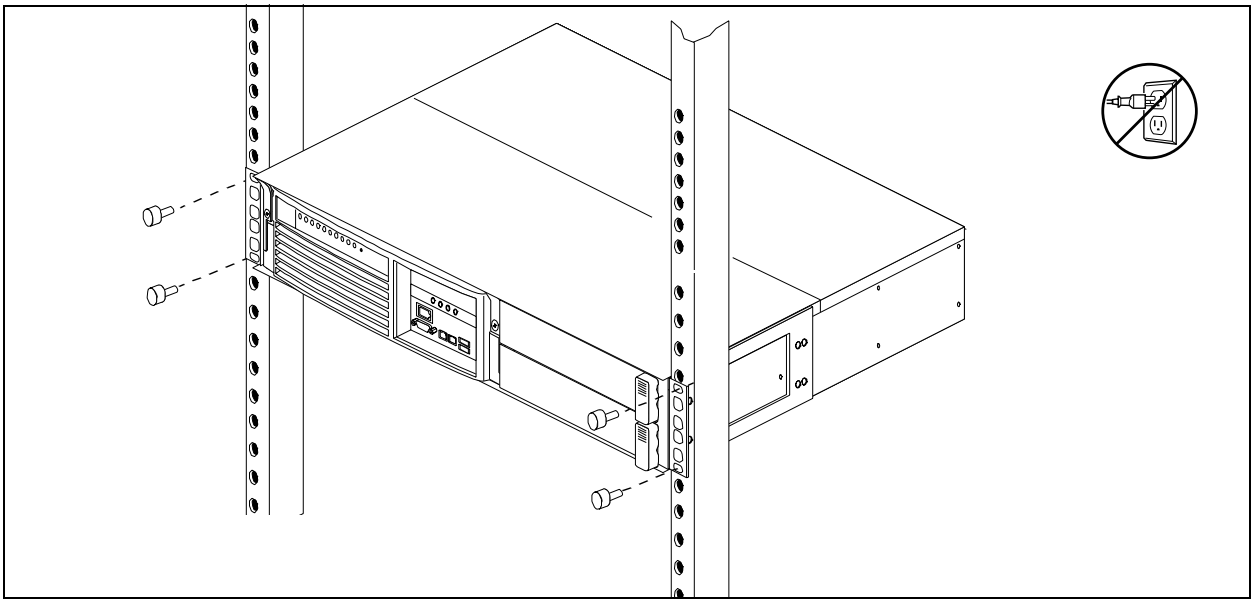
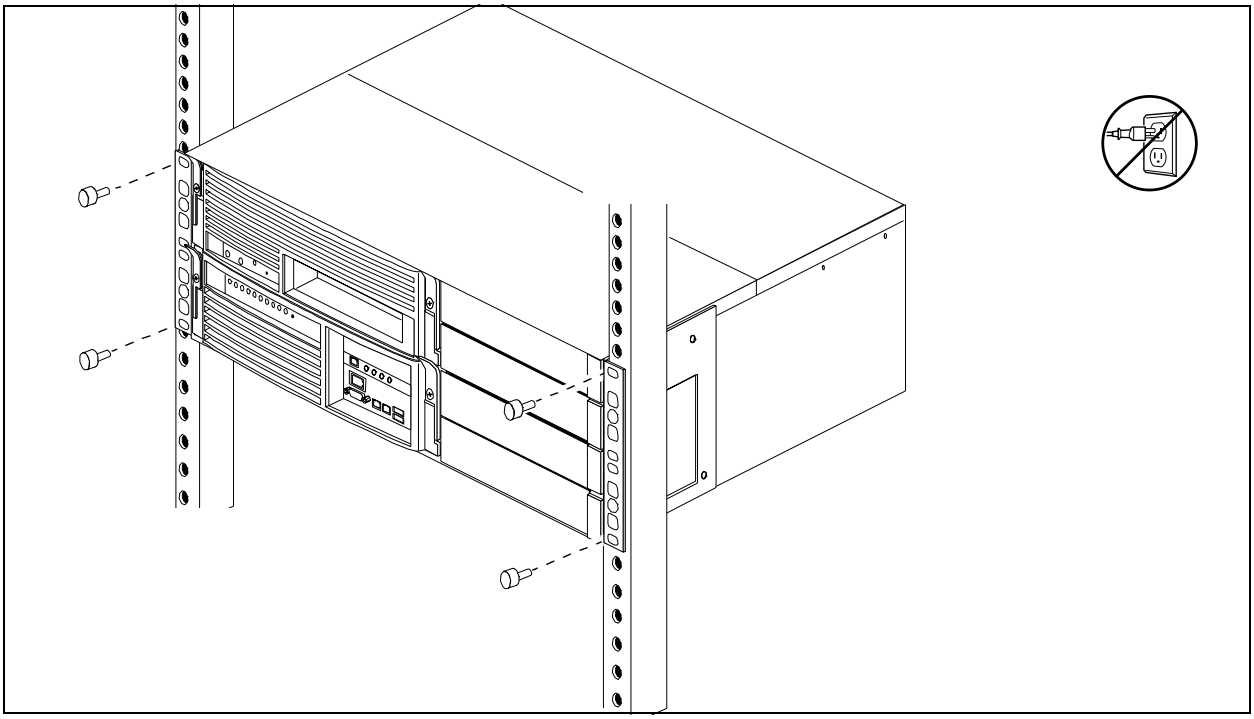


**Figure 56** Fasten the BCM400 platform base chassis to an equipment rack



**5** This procedure is complete.

# Install the Platform Base Chassis on the Wall

This procedure describes how to mount the BCM200 or BCM400 platform base chassis to a wall.

To mount the Business Communications Manager on the wall, you need:

- a wall-mount bracket kit NTAB3422
- four #10 x 2.5 cm (#10 x 1 in.) round head wood screws
- a plywood backboard 2 cm (3/4 in.) thick

**Caution:** Refer to "Environment Checklist" on page 102 for acceptable environmental conditions before selecting a location for the Business Communications Manager.

**Note:** Nortel Networks does not recommended use of the rack-mount brackets for wall mount applications.

1. Mark the location of the plywood backboard on the wall using a pencil. Use a ruler and bubble-level to check that the plywood backboard is level with respect to the wall.
2. Mount the plywood backboard securely to the wall.
3. Mark the location of the wall mount bracket holes on the plywood backboard.
   a. Use the wall mount bracket as a template.
   b. Use a bubble-level to check that the wall mount bracket is level with respect to the plywood backboard.
4. Install four #10 x 2.5 cm (#10 x 1 in.) round-head wood screws in the backboard (supplied).
   a. Do not tighten the screws heads against the backboard. Leave approximately 0.5 cm (0.25 in.) of the screw exposed from the backboard.
   b. Perform a trial-installation of the wall mount bracket on the plywood backboard. Ensure the wood screw heads seat in the wall mount bracket slots. If the wood screws are too tight, loosen until the screw heads fit fully in the slots.
   c. Ensure that the wall mount bracket is level with respect to the plywood backboard.
   d. Remove the wall mount bracket.
5. Align the screw holes on one side of the Business Communications Manager platform base chassis with the wall mounting bracket.

**Note:** The bracket suspends the Business Communications Manager on the wall. Consider the direction you want the media bay modules to face, left or right, when you choose the side to install the bracket.

6 Fasten the wall mount brackets securely to the Business Communications Manager platform base chassis using the screws provided. Refer to Figure 58.

**Caution:** Use only the screws supplied with the wall mounting bracket. Do not replace screws. Other screws can damage the Business Communications Manager.

**Figure 57** Attach the wall-mount brackets to the BCM200 platform base chassis

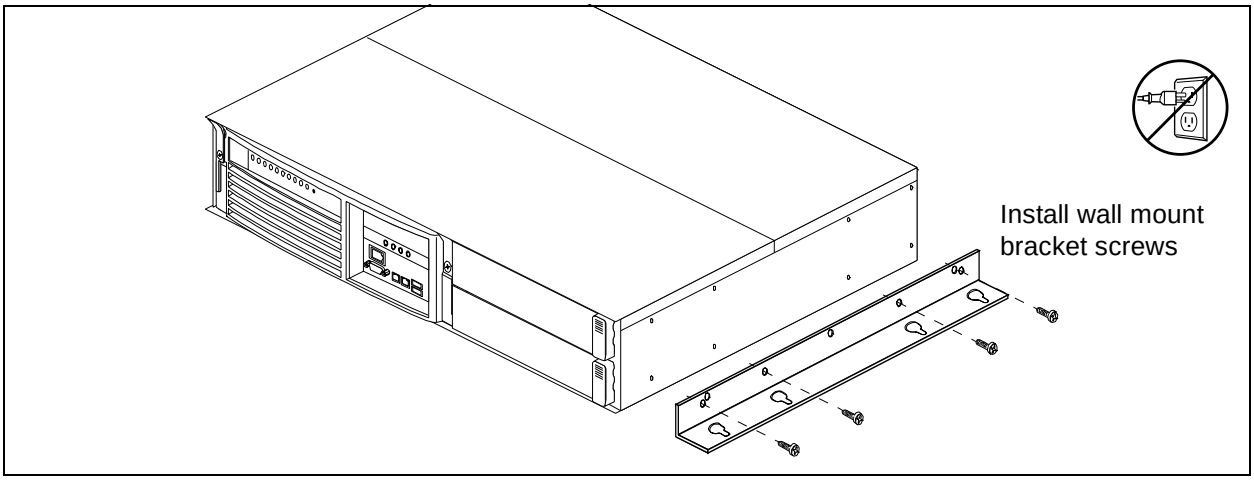
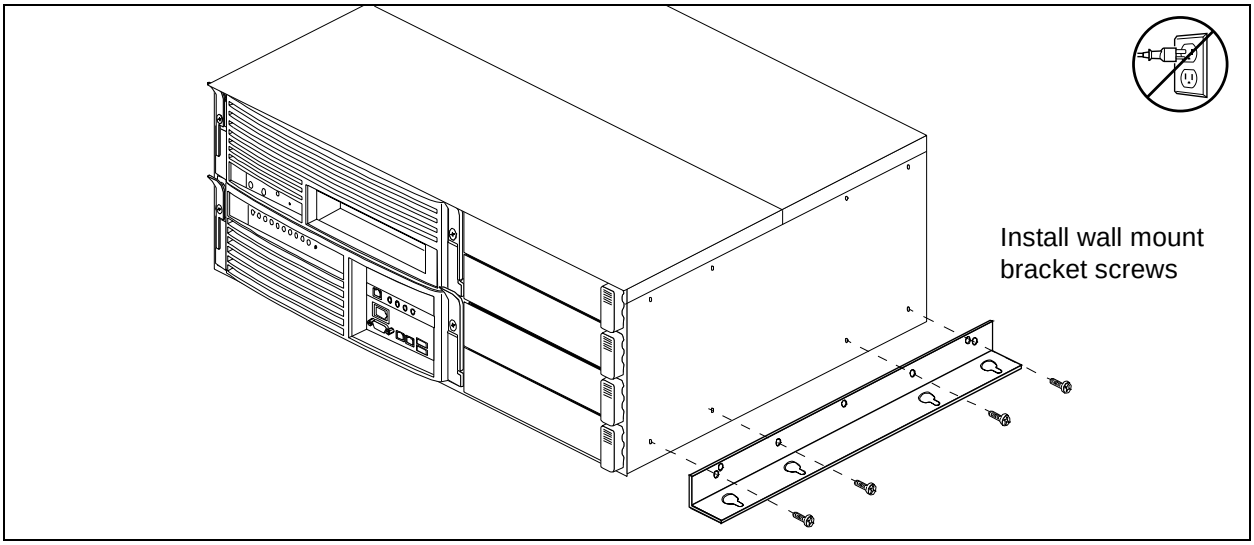



**Figure 58** Attach the wall-mount brackets to the BCM400 platform base chassis




7 Hang the Business Communications Manager platform base chassis on the backboard screws. Make sure the platform base chassis is level. Ensure the wood screwheads seat fully into the wall mount bracket slots.

8 Tighten the wood screws against the wall mount bracket.

9 This procedure is complete.

# Install the Platform Base Chassis on a Flat Surface

Use this procedure to install the Business Communications Manager on any flat surface that can safely support the weight of the unit.

**Caution:** Refer to "Environment Checklist" on page 102 for acceptable environmental conditions before selecting a location for the Business Communications Manager.

**Caution:** Possible damage to the platform base chassis. Do not place anything directly on top of the Business Communications Manager base platform chassis.

To install the Business Communications Manager on a table or shelf:

1. Attach four rubber feet to the corners on the bottom of the platform base chassis.
2. Position the platform base chassis on the table or shelf. Make sure you leave enough space around the unit for ventilation and access to the cables and media bay modules.
3. This procedure is complete.

# Install the Expansion Unit into a Rack

This section describes how to install the Business Communications Manager expansion unit.

The Business Communications Manager expansion unit must be installed close enough to the Business Communications Manager that the 5 m (16 ft) cable between the two units can be connected to the Business Communications Manager without stress on the cable. The expansion unit has the same environmental and electrical requirements as the Business Communications Manager. For more information about these requirements, refer to "Installation Preparation Checklist" on page 102.

The Business Communications Manager expansion unit fits into a standard 19-inch equipment rack. Install the expansion unit in the same rack as the Business Communications Manager.

**Caution:** When installing the Business Communications Manager expansion unit in a rack, do not stack units directly on top of one another. Fasten each unit to the rack with the separate mounting brackets.

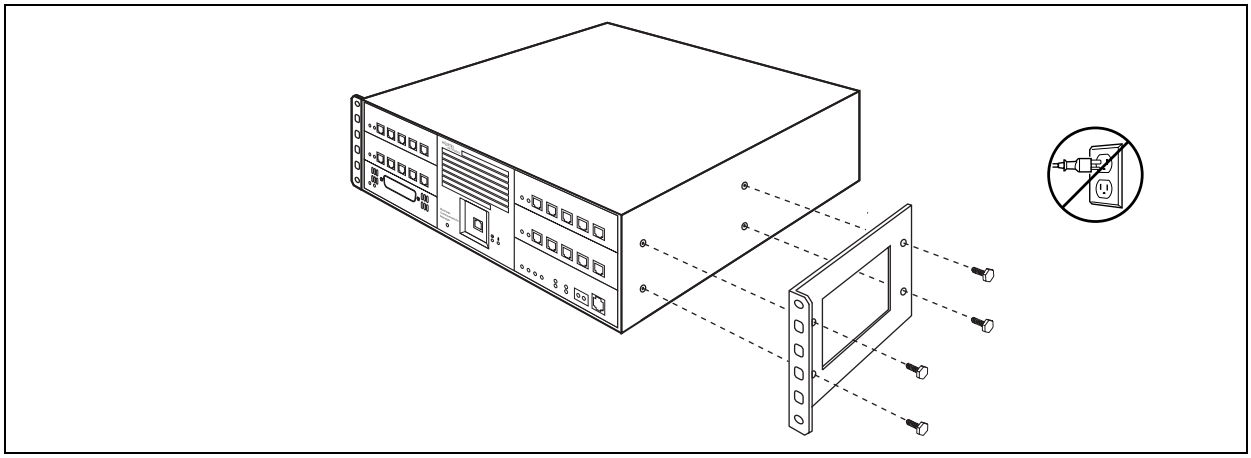
## Attach the mounting brackets to the Expansion Unit

You must install two rack brackets on the expansion unit to allow you to install the unit into the equipment rack. These brackets are supplied with the expansion unit.

1. Place the Business Communications Manager expansion unit on a table.

2 Align the screw holes between the expansion unit and the right rack mounting bracket. Refer to Figure 59.

**Figure 59** Attach the rack mounting bracket to the expansion unit



3 Fasten the bracket to the expansion unit using four screws.

4 Repeat steps 2 and 3 on the other side, with second bracket.

**Caution:** Use only the screws that came with the bracket. Using other screws can damage the equipment.

**Note:** Rack mount bracket

The expansion unit rack mount bracket has an additional set of holes that allows you to install the brackets so that the expansion unit sits flush with the Business Communications Manager chassis in an equipment rack.

## Mount the Expansion Unit to the rack

The mounting brackets you attached to the expansion unit correspond with mounting holes located on the equipment rack.

**Note:** You must supply your own screws to attach the expansion unit to the rack.

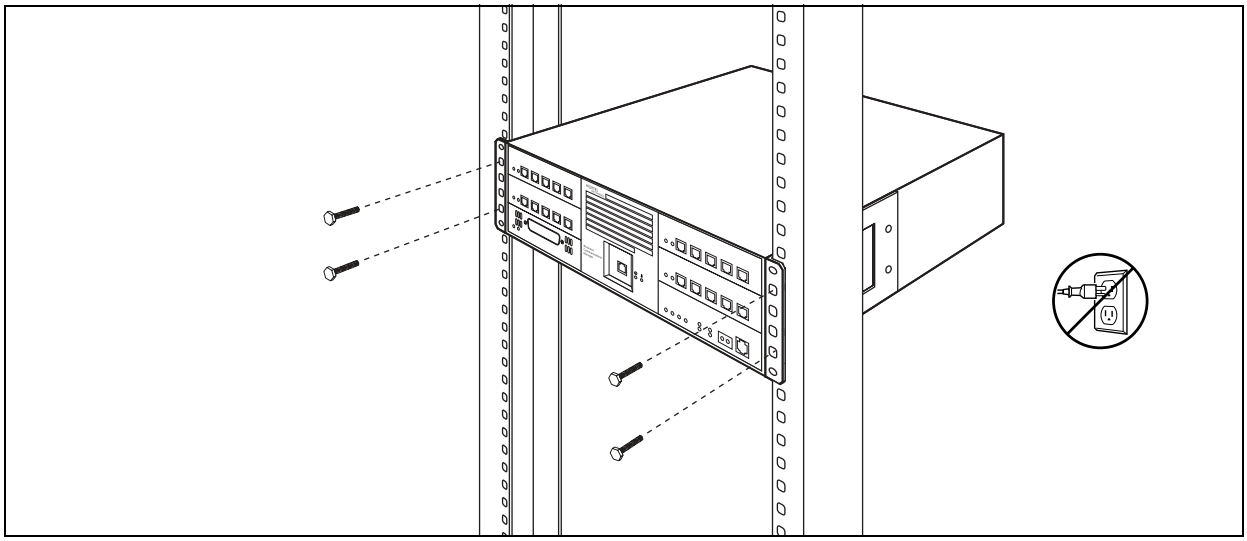
1 Determine the location in the rack you want to install the Business Communications Manager expansion unit.

2 Position the expansion unit in the rack. Refer to Figure 60.

3 Align the holes in the rack mounting bracket with the holes in the rails.

4 Fasten the rack mounting brackets to the equipment rack using four screws.

**Figure 60** Fasten the expansion unit to the equipment rack



## Install the Expansion Unit on a Flat Surface

You can install the Business Communications Manager expansion unit on any flat surface that can support the weight of the unit, and which is within 5 m (16 ft.) of the Business Communications Manager.

**Note:** Do not place anything on top of the expansion unit chassis.

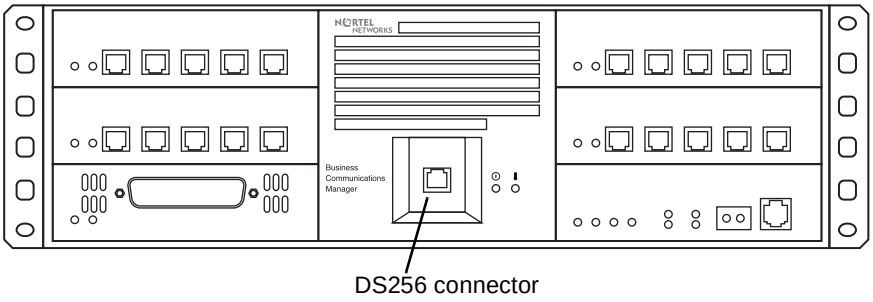
1. Attach the supplied rubber feet to the corners of the bottom of the expansion unit.
2. Position the expansion unit on the table or shelf.
3. Ensure that you leave enough space around the unit for ventilation and access to the cables and media bay modules.

## Connect the Expansion Unit to the Business Communications Manager

After the expansion unit has been installed in the desired location, use the supplied DS256 cable to connect it to the Business Communications Manager.

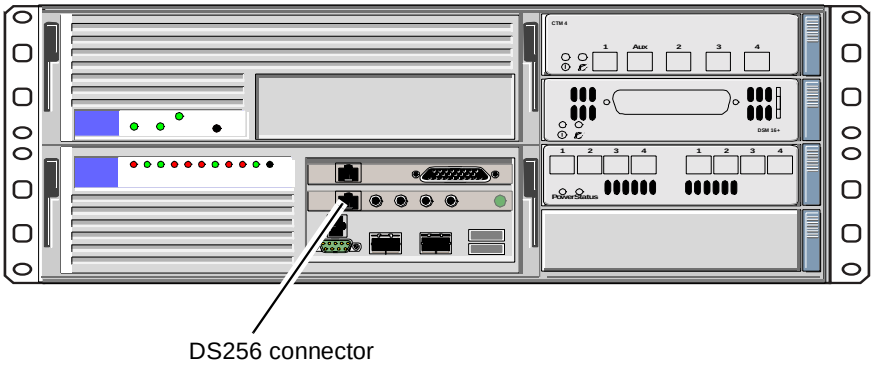
1. Plug one end of the cable into the DS256 connector on the Business Communications Manager expansion unit (see Figure 61).

**Figure 61** DS256 connector on the expansion unit




**2** Plug the other end of the cable into the DS256 connector on the faceplate of the MSC in the Business Communications Manager. Refer to Figure 62.

**Figure 62** Business Communications Manager DS256 connector




**Warning:** The timing in the Business Communications Manager system is critical. Use the correct length cable as supplied with the expansion chassis. The system will not work properly if you connect the Business Communications Manager expansion unit using a cable that varies in length.

# Chapter 4
# Install, Remove, or Replace the Media Bay Modules

Use the procedures in this chapter to select, install, remove, or replace the media bay modules (MBMs) in the Business Communications Manager platform base chassis and the expansion unit. For information on troubleshooting, refer to “Monitor Media Bay Module LEDs” on page 377.

This chapter contains the following information:


- “Media Bay Module System Selection” on page 117
- “Determine system capacity” on page 121
- “Rules for Assigning DS30 Resources” on page 127
- “Set Media Bay Module Dip Switches” on page 130
- “Assign Line and Extension Numbers for Specific Modules” on page 136
- “Install a Media Bay Module” on page 150
- “Remove a Media Bay Module” on page 154
- “Replace a Media Bay Module” on page 157
- “Wire the Media Bay Modules” on page 158
- “Set DNs and Port Numbers” on page 169
- “Media Bay Module Combinations” on page 170
- “Changing Configurations” on page 175
- “System Setup” on page 175


## Media Bay Module System Selection

Media bay modules (MBMs) are plug-in devices that connect your extensions and the public switched telephone network (PSTN) lines to the call processing capabilities of the Business Communications Manager system.

When you order your Business Communications Manager system, there are no media bay modules installed in the Business Communications Manager base platform chassis or Business Communications Manager expansion unit. You are able to select the number and type of media bay modules that best suit your business requirements.

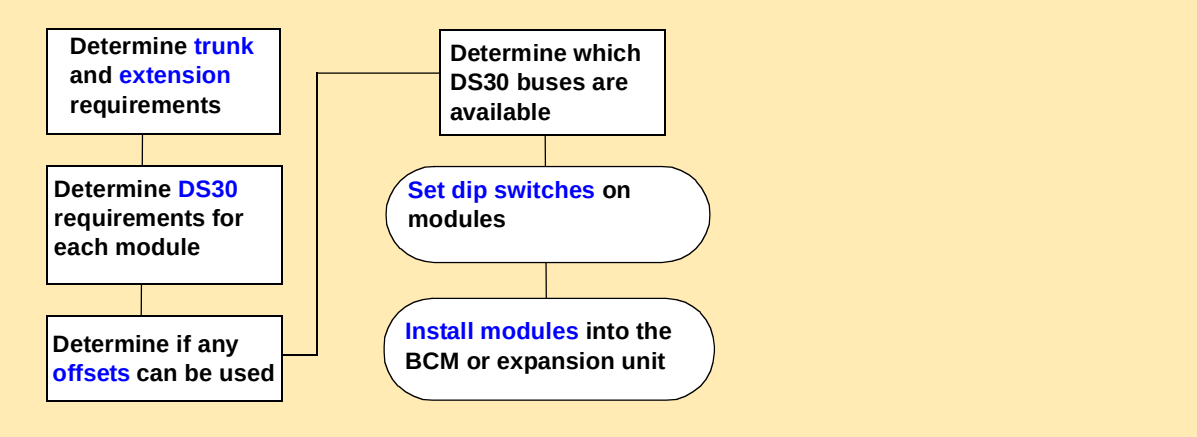
There are three types of media bay modules:

- Trunk media bay module (see “Trunk media bay module selection” on page 118)
- Station media bay module (see “Station media bay module selection” on page 120)
- Specialized media bay module (see “Fiber expansion module selection” on page 121)

For further information on the role and function of each type of MBM, refer to Telephony Components on page 70.

If you have a large Business Communications Manager system, there are some configuration restrictions that can apply to your system. For information about these restrictions, refer to "Rules for Assigning DS30 Resources" on page 127.

**Figure 63** Process for determining modules


Determine trunk and extension requirements
Determine DS30 requirements for each module
Determine if any offsets can be used
Determine which DS30 buses are available
Set dip switches on modules
Install modules into the BCM or expansion unit

The first step in selecting the media bay modules is to establish the number of extensions (internal lines) and PSTN lines (trunk lines) you have or need. This step allows you to determine the number and type of media bay modules you require. The following sections describe how to determine which modules, and how many, you require for your system.

- "Trunk media bay module selection" on page 118
- "Station media bay module selection" on page 120
- "Fiber expansion module selection" on page 121

After you determine the module types required, calculate how the modules use the available system resources. The following sections describe how the modules work within the available channels on the Media Services Card (MSC) in the Business Communications Manager (see "Determine system capacity" on page 121).

## Trunk media bay module selection

The number and type of lines coming into your system determine which trunk media bay modules, and how many modules, you require to support your needs. Trunk lines come from either the public network (PSTN), or they support connections in a private network.

If you are setting up an entirely new system, perform a site survey to determine your current and future needs. Nortel Networks recommends that you perform the survey before you order any modules.

**Note:** If you plan to add any lines in the near future, include them in your initial estimates.

To select the trunk media bay modules:

1. Record the number of each type of line you have in Table 14. If you do not know the number or type of lines you have, contact your service provider.
2. Use the number of lines and the number of lines per module to determine how many modules you need.

**Table 14** Determining trunk module requirements

| Type of lines | Number of lines | Type of media bay module | Number of lines per module | Number of modules required |
|---|---|---|---|---|
| T1 digital lines | | DTM | 24 | _____ DTM |
| Universal T1 MUX digital lines | | DDIM | 24 (also requires a full DS30 channel for the Data Module) | _____ DDIM |
| PRI digital lines (NA) - (required for Companion wireless) | | DTM | 23 | _____ DTM |
| E1 digital lines | | DTM | 30 | _____ DTM |
| PRI digital lines (EMEA) | | DTM | 30 | _____ DTM |
| Analog lines | | CTM4 (North American systems only) | 4 | _____ CTM |
| Analog lines | | CTM8 (North American systems only) | 8 | _____ CTM |
| Analog lines | | GATM4 | 4 | _____ GATM |
| Analog lines | | GATM8 | 8 | _____ GATM |
| Analog lines | | 4X16 combination module (North American system only) | 4 (also requires a full DS30 channel for the DNs) | _____ CTM |
| BRI ISDN lines | | BRIM S/T | 4 ISDN loops | _____ BRIM S/T |

* A Universal T1 MUX is a type of T1 digital line that contains a combination of digital telephone lines and data lines.

For example:

- If you require 24 T1 digital lines, you need one DTM because a single DTM can handle 24 T1 lines (North America).
- If you require two analog lines and 24 T1 digital lines, you need one CTM and one DTM.

**Note:** Although the DTM supports several types of digital lines, you cannot connect different types of lines to the same DTM.
You can add a maximum of three DTMs or DDIMs to your Business Communications Manager system.

**Tip:** The BCM400 platform base chassis holds a maximum of four media bay modules. If you require more modules the Business Communications expansion unit supports a maximum of six additional modules.

3 This procedure is complete.

## Station media bay module selection

The number and type of telephones and related equipment you have determines which station media bay modules you require.

**Note:** If you are adding any extensions in the near future, include them in your calculations.

1 In Table 15, record the number of each type of extension you have.

2 Use the number of extensions and the number of extensions per module to determine how many modules you need.

**Table 15** Station media bay modules required

| Type of extension | Number of extensions | Type of media bay module | Number of extensions per module | Number of modules required |
|---|---|---|---|---|
| Digital extensions | | DSM 16/DSM 16+ | 16 | _____ DSM 16 |
| Digital extensions | | DSM 32/DSM 32+ | 32 | _____ DSM 32 |
| Digital extensions | | 4X16 | 16 | _____ DSM 16 |
| Analog extensions | | ASM 8 | 8 | _____ ASM 8 |
| Analog extensions | | ASM 8+ | 8 | _____ ASM 8+ |
| Cordless handsets (DECT) (selected profiles only) | | DECT | 32 | _____ DECT |
| Digital extensions are digital or IP telephones. You do not need to include IP telephones when calculating the number of required DSM modules. For a list of the telephones that can be used with the Business Communications Manager system, refer to "Telephones and adapters" on page 91.<br>Analog extensions include single line telephones, fax machines, and modems. | | | | |

For example, in North America:

- If you require 12 digital extensions, you need one DSM 16/DSM 16+
- If you require 24 digital extensions, you need one DSM 32/DSM 32+

**Note:** If you require only a few analog extensions, you can use an Business Communications Manager ATA 2 to connect these devices to your DSM 16, DSM 32, or the DSM connector on a 4X16 module. Each analog extension requires a Business Communications Manager ATA 2.

**Tip:** The BCM400 can hold a maximum of four media bay modules. If you require more, you also need an Business Communications Manager expansion unit.

**3** This procedure is complete.

### Fiber expansion module selection

A special media bay module allows you to convert existing Norstar expansion modules from the Norstar ICS to full Business Communications Manager capability.

The fiber expansion module (FEM) allows you to connect a maximum of six Norstar expansion modules to a Business Communications Manager. Each FEM connection requires one DS30 channel, therefore, the Business Communications Manager used for this purpose can only support one FEM module if you are converting a fully-configured Norstar system.

## Determine system capacity

After you have selected the modules you require, you must ensure that the Business Communications Manager can support all the modules. System capacity is ultimately determined by the line requirements of each module.

The following sections describe the MSC DS30 buses, which manage the DS30 channels, and how you fit your modules into the overall system planning:

- "Understand DS30 numbers" on page 122
- "Setting offsets" on page 123

## Understand DS30 numbers

A DS30 bus is a block of virtual pathways on the media services card (MSC).

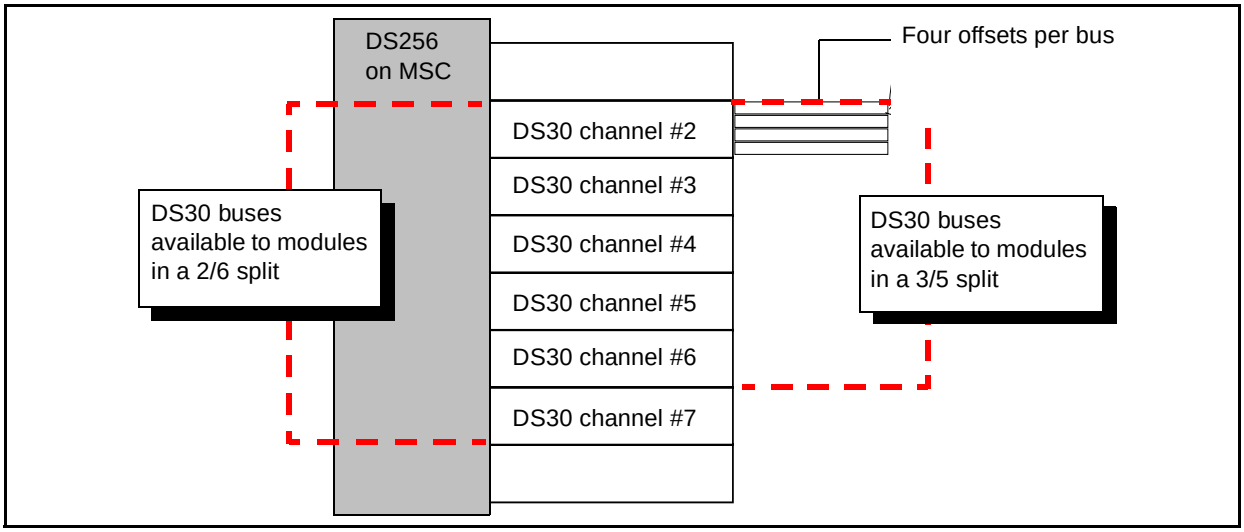
On a default system, six buses of DS30 channel blocks can be assigned to media bay modules. The block to which the module is assigned, determines the range of line (trunk) numbers or extension numbers (DNs) that can be allocated by the module to the equipment connected to that module. The other two blocks are permanently routed to the PEC digital signal processors (DSPs) to support internal Business Communications Manager functions such as voice mail, VoIP trunks, IVR, and IP telephony functions. This configuration is called a 2/6 channel split.

You can change the DS30 allocation to a 3/5 split to accommodate increased IP telephony or VoIP trunk requirements. You do this by assigning bus 7 to the voice data sector. This choice should be made at system startup, but a default system can be changed through the Unified Manager to a 3/5 split after startup if IP requirements increase. At startup, you indicate the split you want when you run the Quick Start Wizard. Refer to the Programming Operations Guide for details.

**Warning:** If you change the channel split from 3/5 to 2/6 after your system is configured, you will lose all the data and optional application connections.

Figure 64 shows a model of how the MSC DS30 buses are a subgroup of the DS256 bus on the MSC. The diagram also shows the offset channels, which are a subgroup of the buses.

**Figure 64** DS30 model




DS30 numbers are set using the number 4, 5, and 6 dip switches on the back or underside of the media bay modules. The exception is the FEM module. The FEM dip switches turn on ports, each of which consumes one bus.

## Setting offsets

Each offset represents one-quarter of a DS30 bus. Each bus, supports 16 lines (32 time slots) for most modules.

**Note: Double Density**

The 32 time slots are important when you are working with station media bay modules. The DSM 16+, DSM 32+, ASM 8, and ASM 8+ modules can be configured, using the offset dip switches, to use each of these time slots as separate telephone lines. This, essentially, doubles your system telephone capacity. On a default 3.0 system, this feature, called partial double density (PDD), is available on DS30 2, 3, 4, and 5. DS30 6 and 7 maintain the current two time slots per line configuration, which supports the Companion application. For systems where Companion is not required, you can use the Unified Manager to change all six DS30 buses to full double-density (FDD).

Exception: If your system has a 3/5 channel split, only DS30 6 becomes double density and is available to media bay modules when the system is changed to FDD. However, 16 more channels on DS30 7 are also made available for IP telephones.

Exceptions:

- DTM modules support 23 to 30 lines per channel
- FEM modules, where each bus supports one Norstar fiber module connection.

Offsets are numbered 0, 1, 2, and 3. Modules that require less than a full bus can be assigned a DS30 number and an offset number. This allows more than one module to be assigned the same DS30 number, but with a different offset number.

Modules that can have offsets assigned include CTM, CTM 8, BRIM S/T, ASM 8, and ASM 8+. For example, two CTM 8s can be assigned to the same DS30 number, with different offset numbers. However, you cannot assign a CTM 8 and an BRI module to the same DS30.

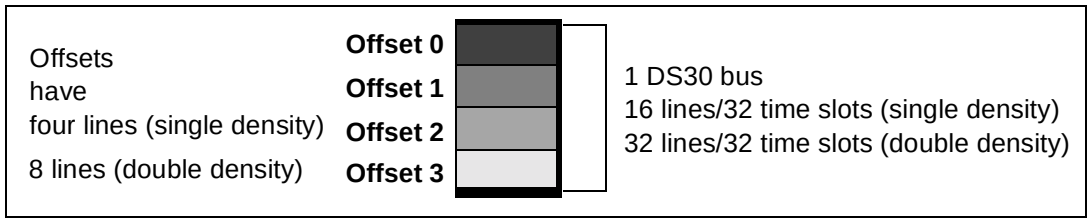
Offsets are assigned using dip switches 1, 2, and 3 on the media bay module.

**Note:** Media bay modules that do not, or cannot, share DS30 buses always assign the offset as 0 (zero). As well, if the module requires more than one bus, such as the 4x16 module or the DDIM, only the first DS30 is set on the dip switches. The next consecutive DS30 channel number is automatically assigned by the module.

Figure 65 on page 124 shows a DS30 broken down into four offset groups of four (single density) or eight (double density) lines each.

**Note:** When you enable a station module for double density, the line numbers double.

**Figure 65** Offsets are part of DS30 channel line groups




## Determine module channel requirements

Figure 66 shows the DS30 channel requirements of each module. Note the differences between modules set to single density and modules set to double density.

**Note:** If you choose a CTM8, DDIM, or 4X16 module, there are some restrictions about the offsets you can choose. Refer to the dip switch settings in "CTM switch settings" on page 138 and "4X16 switch settings" on page 141 for details

**Figure 66** Space requirements for media bay modules, on a per-DS30 configuration

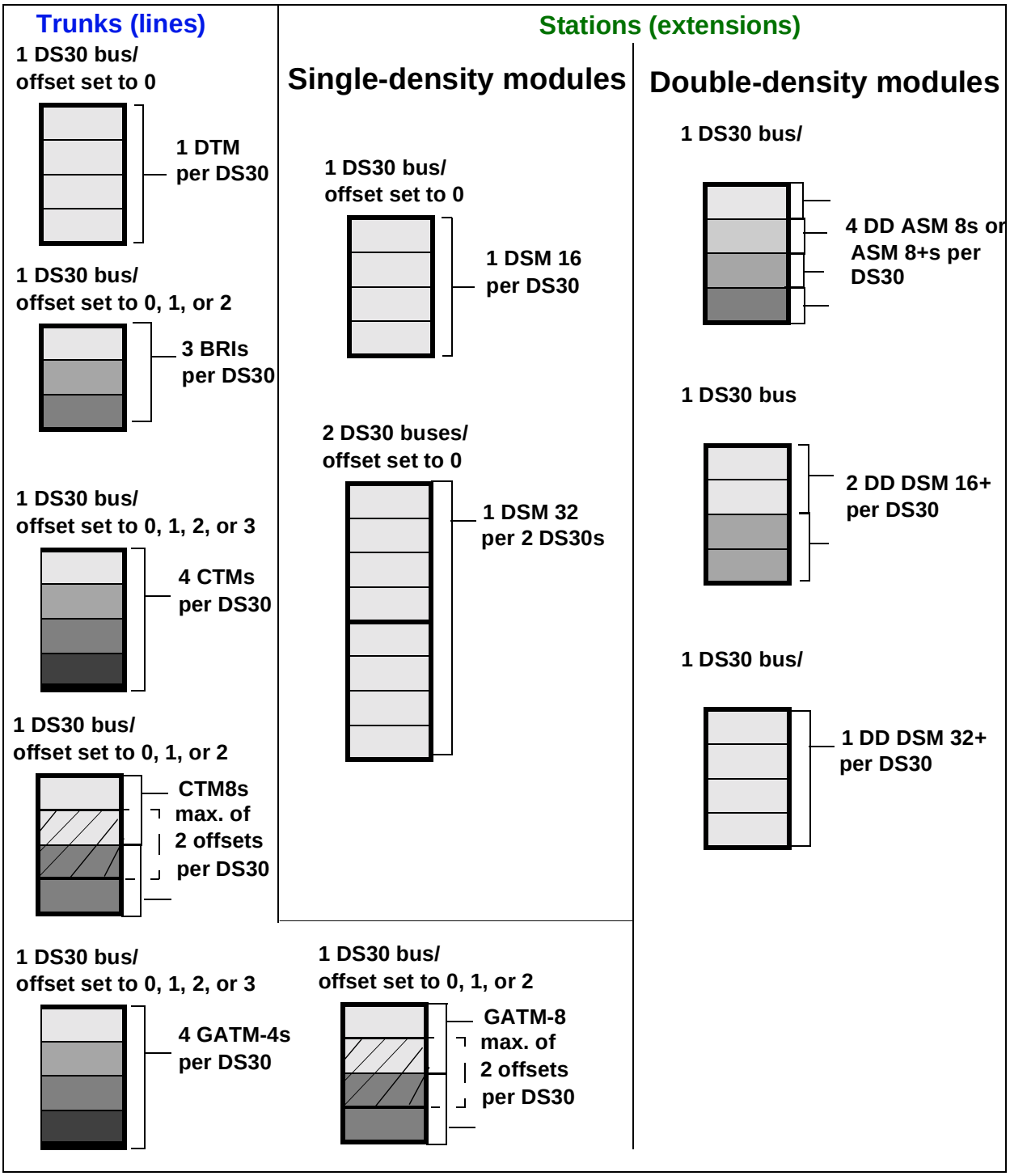
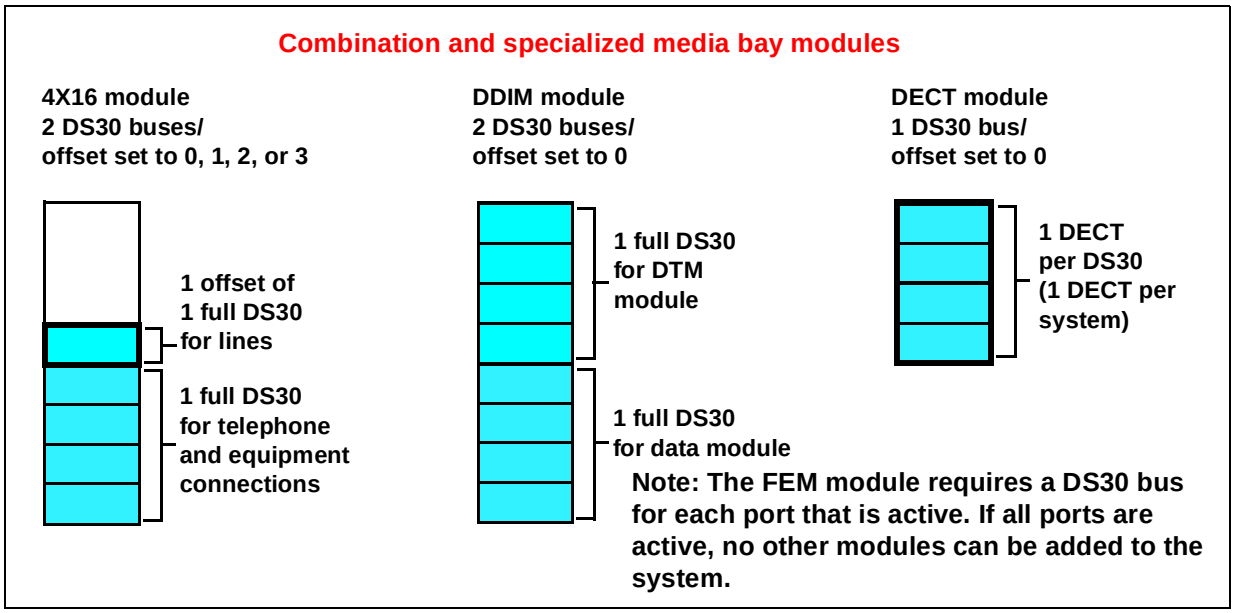

Trunks (lines)
Stations (extensions)
Single-density modules
Double-density modules
1 DS30 bus/ offset set to 0
1 DTM per DS30
1 DS30 bus/ offset set to 0, 1, or 2
3 BRIs per DS30
1 DS30 bus/ offset set to 0, 1, 2, or 3
4 CTMs per DS30
1 DS30 bus/ offset set to 0, 1, or 2
CTM8s max. of 2 offsets per DS30
1 DS30 bus/ offset set to 0, 1, 2, or 3
4 GATM-4s per DS30
1 DS30 bus/ offset set to 0
1 DSM 16 per DS30
2 DS30 buses/ offset set to 0
1 DSM 32 per 2 DS30s
1 DS30 bus/ offset set to 0, 1, or 2
GATM-8 max. of 2 offsets per DS30
1 DS30 bus/
4 DD ASM 8s or ASM 8+s per DS30
1 DS30 bus
2 DD DSM 16+ per DS30
1 DS30 bus/
1 DD DSM 32+ per DS30

**Figure 67** Space requirements for special media bay modules




**1** Make a list of modules and the space requirements for each module you chose (see to Tab;e 15).

**Table 16** Matching modules to DS30 channel capacity

| DS30 split 2/6 (default) _____ 3/5 (extra IP lines) _____ | | |
|---|---|---|
| **Type of module** | **Number required** | **DS30s/offsets required** |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

**2** Set the bus numbers and offsets on the dip switches of the module. Refer to Set Media Bay Module Dip Switches on page 130. Note that you assign trunk modules starting from the bottom DS30, and you assign station modules starting from the top DS30.

3 Install the modules into the Business Communications Manager or expansion unit. Refer to Chapter 4, “Install, Remove, or Replace the Media Bay Modules,” on page 117.

4 This procedure is complete.

# Rules for Assigning DS30 Resources

Media bay modules are assigned to DS30 buses in a specific hierarchical manner. This section describes the preferred order of positioning for each type of module.

## Notes about assigning modules

The following are some general notes about assigning modules:

- The dip switches on the DDIM module are used to set the DS30 designation for the DTM part of the module. The module automatically assigns an additional DS30 for the data module part of the DDIM. You cannot choose DS30 7 for the DDIM module, because the data module would not be accessible. The same applies to DS30 6 if your system is set to a 3/5 split. Refer to DDIM switch settings on page 137.
- If you chose a 3/5 channel split for your system, DS30 7 cannot be used by any module. For modules that require two buses, this means that you cannot set the dip switches to DS30 6 for those modules, because the second level of lines falls into DS30 7, which is not be accessible (see Figure 68 on page 129).
- Refer to “Understand DS30 numbers” on page 122 for more information about 2/6 and 3/5 DS30 channel splits.
- DSM 32 modules require two DS30 numbers. When you assign the first DS30 number to a DSM 32, the module automatically adds the next DS30 number. For example, if you assign DS30 2 to an DSM 32, it uses DS30 2 and 3. However, you cannot choose DS30 7 for the DSM32 module, because the second level of DSM lines would not be accessible. The same applies to DS30 6 if your system is set to a 3/5 split. Refer to DSM switch settings on page 144.
- DSM 32+ modules can be set to either single or double density. When they are set to double density, the module only requires one DS30 bus.
- The dip switches on the 4X16 module are used to set the DS30 designation and offset for the CTM part of the module. The module automatically assigns an additional DS30 for the 16 DSM lines. However, you cannot choose DS30 7 for the 4X16 module, because the DSM lines would not be accessible. The same applies to DS30 6 if your system is set to a 3/5 split. Refer to 4X16 switch settings on page 141.

- Companion: configure the DSM or DSMs handling Business Communications Manager Companion to DS30 DS30 6 or 7. You must change the module number of any trunk media bay modules configured to module 6 or 7 to an unassigned module number to prevent conflicts with Companion.

**Note:** Companion DS30 split restrictions:

If you choose a 3/5 channel split for your system, the second module cannot be assigned. Therefore, you can add a maximum of 16 Companion base stations, which support a maximum of 30 handsets. This means you can only use a DSM 16 on DS30 6. You cannot assign a DSM 32.

If your system is set to full double density (FDD), DS30 6 and/or 7 do not support Companion.

- The CTM8 module, when set to single density, uses two offsets on a DS30 bus. You assign the first offset to the module, and the second offset is automatically selected. This means that you can choose offset pairs 0-1, 1-2, or 2-3. Because the module requires two offsets on the same DS30, you cannot select offset 3. Refer to CTM switch settings on page 138.

  When the CTM8 is set to double density, you can install two CTM8s per DS30 bus, using all four offsets.

- Not all modules are available to all systems. Refer to "Media Bay Module System Selection" on page 117 for specifics about each module.

**Note:** Remember, if you have chosen a 3/5 channel split for your system, DS30 7 is no longer available for media bay modules.

## Choose the assigned order for modules

Assign the media bay modules and DS30 channels in the order shown in Figure 68 on page 129.

Station modules are assigned starting with DS30 2. This allows telephones to start numbering from the system Start DN (the default is 221). The exception to this is a DSM used for Companion, which must be installed on DS30 6 (DSM32) or DS30 6 and 7 (two DSM 16s). If your system is set to a 3/5 split, you can only assign a DSM16 to DS30 6 for Companion.

Trunk modules are assigned starting at DS30 7, in a system with a 2/6 DS30 split, and at DS30 6 in a system with a 3/5 split. The exception to this is the 4X16 module and the DDIM, which require two DS30 buses, so it must be set to a DS30 that has the next channel open.

**Figure 68** Assigning single-density modules to the DS30 channel hierarchy

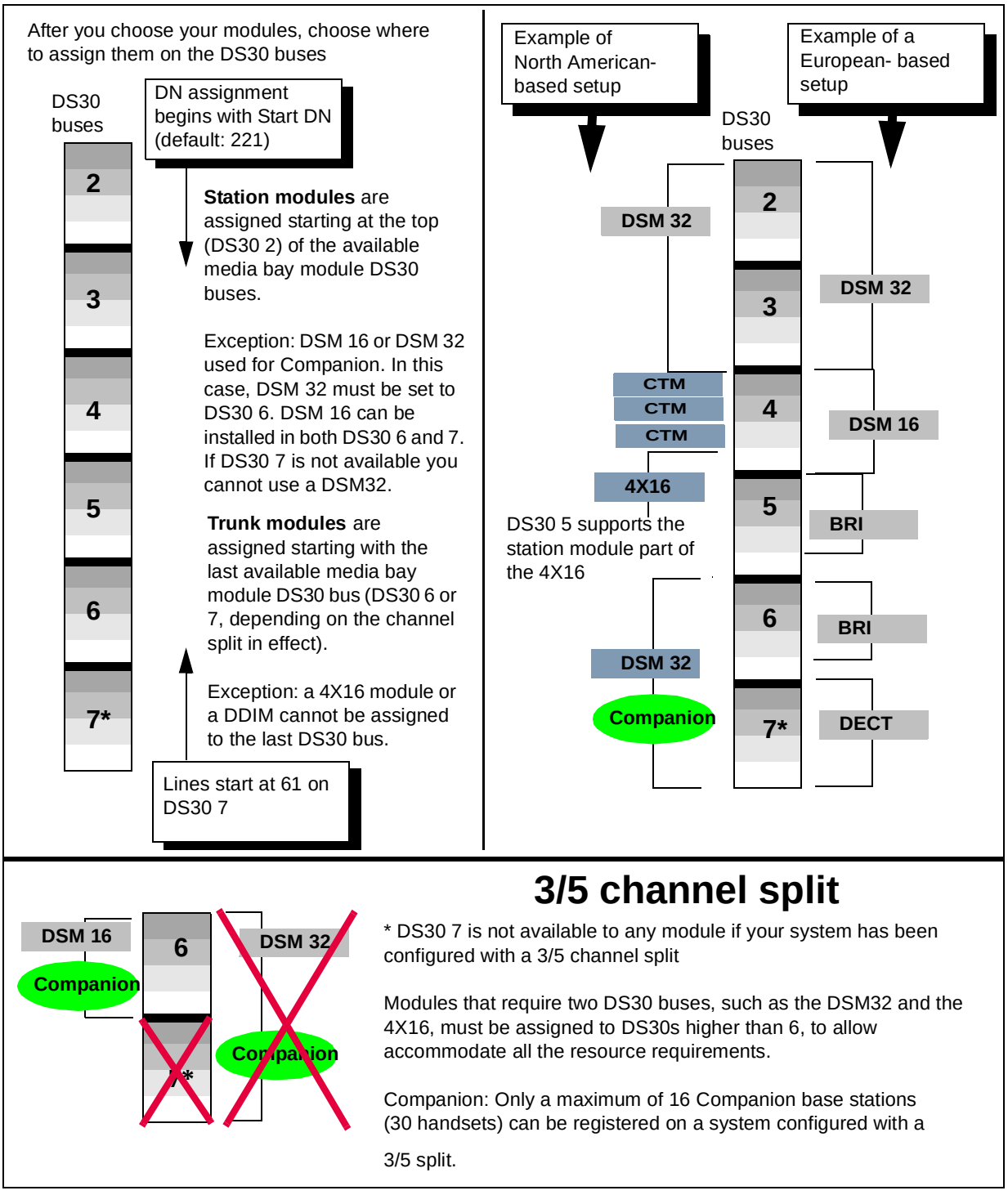
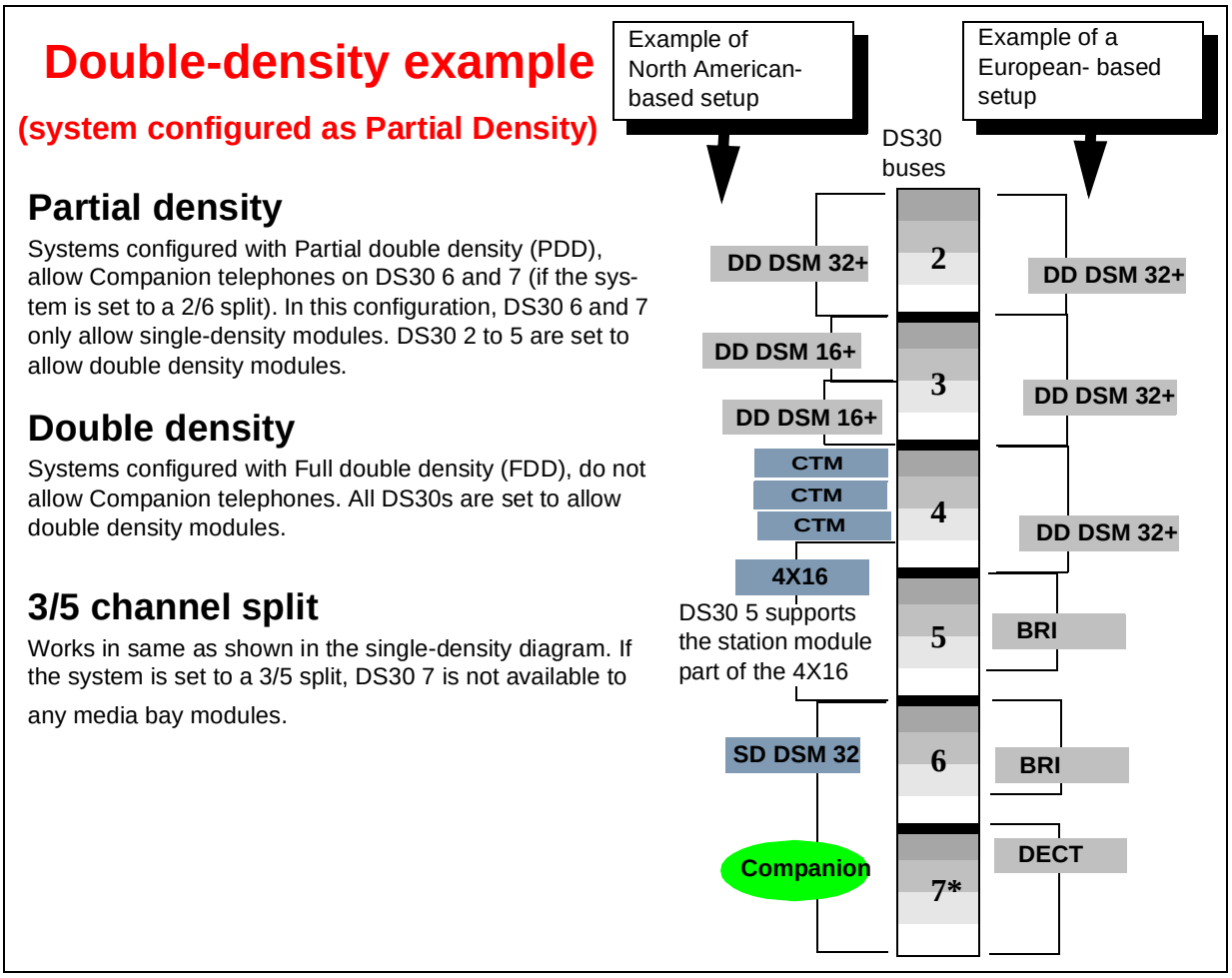

After you choose your modules, choose where to assign them on the DS30 buses
DS30 buses
DN assignment begins with Start DN (default: 221)
2
3
4
5
6
7*
Station modules are assigned starting at the top (DS30 2) of the available media bay module DS30 buses.
Exception: DSM 16 or DSM 32 used for Companion. In this case, DSM 32 must be set to DS30 6. DSM 16 can be installed in both DS30 6 and 7. If DS30 7 is not available you cannot use a DSM32.
Trunk modules are assigned starting with the last available media bay module DS30 bus (DS30 6 or 7, depending on the channel split in effect).
Exception: a 4X16 module or a DDIM cannot be assigned to the last DS30 bus.
Lines start at 61 on DS30 7
Example of North American-based setup
Example of a European- based setup
DS30 buses
DSM 32
CTM
CTM
CTM
4X16
DS30 5 supports the station module part of the 4X16
DSM 32
DSM 16
BRI
BRI
DSM 32
Companion
DECT
DSM 16
Companion
DSM 32
3/5 channel split
* DS30 7 is not available to any module if your system has been configured with a 3/5 channel split
Modules that require two DS30 buses, such as the DSM32 and the 4X16, must be assigned to DS30s higher than 6, to allow accommodate all the resource requirements.
Companion: Only a maximum of 16 Companion base stations (30 handsets) can be registered on a system configured with a 3/5 split.

**Figure 69** Assigning double density modules to the DS30 channel hierarchy


Double-density example
(system configured as Partial Density)
Partial density
Systems configured with Partial double density (PDD), allow Companion telephones on DS30 6 and 7 (if the system is set to a 2/6 split). In this configuration, DS30 6 and 7 only allow single-density modules. DS30 2 to 5 are set to allow double density modules.
Double density
Systems configured with Full double density (FDD), do not allow Companion telephones. All DS30s are set to allow double density modules.
3/5 channel split
Works in same as shown in the single-density diagram. If the system is set to a 3/5 split, DS30 7 is not available to any media bay modules.
Example of North American-based setup
Example of a European- based setup
DS30 buses
DD DSM 32+
DD DSM 16+
DD DSM 16+
CTM
CTM
CTM
4X16
DS30 5 supports the station module part of the 4X16
SD DSM 32
Companion
2
3
4
5
6
7*
DD DSM 32+
DD DSM 32+
DD DSM 32+
BRI
BRI
DECT

## Set Media Bay Module Dip Switches

Assign dip switch settings before you install a media bay module. The settings determine which line numbers (trunks) or DNs (extensions) the equipment connected to the module will have access to. The dip switches are located on the back or underside of the media bay module.

**Note:** Fiber expansion module (FEM) switches

The switches on the fiber expansion module (FEM) do not work in the same way as those of the Trunk or Station MBMs. On the FEM, the switches turn the fiber ports on and off. For information about setting the switches on an FEM, refer to "FEM switch settings" on page 149.

Start from the list of modules you chose.

After you determine which DS30 buses you want to use, and the DS30 resources each module requires, determine the location of the modules on the DS30 array. From that information, you choose switch settings for each module. These settings are then set on the module dip switches.

This chapter describes the latter process of positioning your modules in the DS30 hierarchy and determining and setting the dip switch settings on the module.

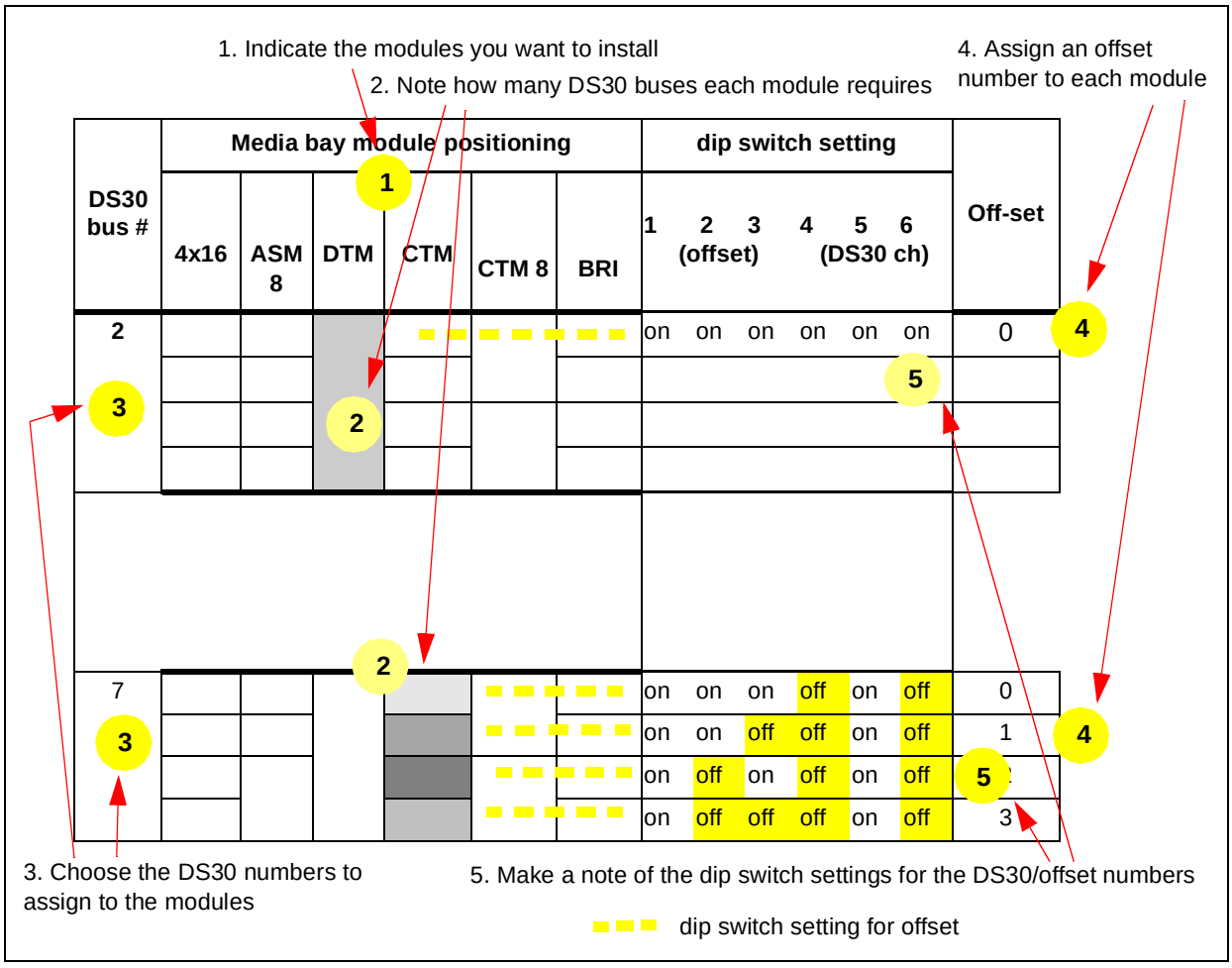
## Determine module dip switch settings

After you determine in which order you want to assign the modules, you determine the specific switch settings for each module.

1. Use Table 17 on page 133 (trunk modules) and Table 18 on page 134 (station modules) to determine a switch setting for all modules except the DECT and FEM modules. Figure 70 on page 132 shows an example of the table and how to do the following steps:
2. On Table 17 or Table 18 circle the module names.
3. Number the order in which you want to assign the modules.
4. Determine the number of DS30s each module requires. For some station modules this depends on whether you choose to set the module to single or double density.
5. Circle the DS30 bus and offset numbers.
6. Follow the DS30 bus and offset number to the far right column where the switch settings are indicated. Circle the setting for each module.

**Note:** If you must assign specific line or extension numbers to a module, refer to the individual switch tables in "Assign Line and Extension Numbers for Specific Modules" on page 136 for line and DN listings.

**Figure 70** How to use the configuration map




**Example:** Position your DSM 32 module (step 1), which requires two full DS30 buses (step 2), in DS30 2 and 3 (step 3). Moving across, note that the offset is 0 (step 4). Set the dip switches on the module to match the dip switch settings indicated for that offset (step 5).

Table 17 shows possible DS30 and offset configurations for each type of trunk module, and the corresponding switch settings. For DECT and FEM settings, refer to "DECT switch settings" on page 149 and "FEM switch settings" on page 149.

**Table 17** Possible trunk media bay module dip switch settings

| DS30 bus # | Media bay module positioning (trunk modules) | | | | | | | | | dip switch settings | Offsets |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4x16 Offsets 0,1, 2, 3 Line Exten. | | DDIM Offset 0 | | DTM Offset 0 | CTM Offsets 0, 1, 2, 3 | CTM 8 Offsets 0, 1, 2 | GATM Offsets 0, 1, 2, 3 | GATM8 Offsets 0, 1, 2 | BRI Offsets 0, 1, 2, 3 | 1 2 3 4 5 6 (offset) (DS30 #) | |
| 2 | 0 | Picks up ch. #3 | 0 | Picks up ch. #3 | 0 | 0 | 0 | 0 | 0 | 0 | on on on on on on | 0 |
| | 1 | | | | | 1 | 1 | 1 | 1 | 1 | on on off on on on | 1 |
| | 2 | | | | | 2 | 2 | 2 | 2 | 2 | on off on on on on | 2 |
| | 3 | | | | | 3 | | 3 | | | on off off on on on | 3 |
| 3 | 0 | Picks up ch. #4 | 0 | Picks up ch. #4 | 0 | 0 | 0 | 0 | 0 | 0 | on on on on on off | 0 |
| | 1 | | | | | 1 | 1 | 1 | 1 | 1 | on on off on on off | 1 |
| | 2 | | | | | 2 | 2 | 2 | 2 | 2 | on off on on on off | 2 |
| | 3 | | | | | 3 | | 3 | | | on off off on on off | 3 |
| 4 | 0 | Picks up ch. #5 | 0 | Picks up ch. #5 | 0 | 0 | 0 | 0 | 0 | 0 | on on on on off on | 0 |
| | 1 | | | | | 1 | 1 | 1 | 1 | 1 | on on off on off on | 1 |
| | 2 | | | | | 2 | 2 | 2 | 2 | 2 | on off on on off on | 2 |
| | 3 | | | | | 3 | | 3 | | | on off off on off on | 3 |
| 5 | 0 | Picks up ch. #6 | 0 | Picks up ch. #6 | 0 | 0 | 0 | 0 | 0 | 0 | on on on on off off | 0 |
| | 1 | | | | | 1 | 1 | 1 | 1 | 1 | on on off on off off | 1 |
| | 2 | | | | | 2 | 2 | 2 | 2 | 2 | on off on on off off | 2 |
| | 3 | | | | | 3 | | 3 | | | on off off on off off | 3 |
| 6 | 0 | Picks up ch. #7 | 0 | Picks up ch. #7 | 0 | 0 | 0 | 0 | 0 | 0 | on on on off on on | 0 |
| | 1 | | | | | 1 | 1 | 1 | 1 | 1 | on on off off on on | 1 |
| | 2 | | | | | 2 | 2 | 2 | 2 | 2 | on off on off on on | 2 |
| | 3 | | | | | 3 | | 3 | | | on off off off on on | 3 |
| 7*** | Not supported | | Not supported | | 0 | 0 | 0 | 0 | 0 | 0 | on on on off on off | 0 |
| | | | | | | 1 | 1 | 1 | 1 | 1 | on on off off on off | 1 |
| | | | | | | 2 | 2 | 2 | 2 | 2 | on off on off on off | 2 |
| | | | | | | 3 | | 3 | | | on off off off on off | 3 |

Module set to offset 0 Module set to offset 1 Module set to offset 2 Module set to offset 3

Each shaded square represents the amount of the DS30 channel, and the offset, which the module requires.

***If your system is configured with a 3/5 DS30 channel split, DS30 channel 7 is not available to media bay modules and DS30 channel 6 is not supported for the 4X16 and DDIM modules.

Table 17 shows possible DS30 and offset configurations for each type of station module, and the corresponding switch settings. Note that offset 1 indicates the density mode for DSM 16+ and DSM 32+ modules (SDD = single density, offset 1:on; FDD = Full Double Density, offset 1:off).

**Table 18** Possible station media bay module dip switch settings

| DS30 bus # | Media bay module positioning (station modules) | | | | | | dip switch settings (Single density) | | | | | | dip switch settings (Double density) | | | | | | Offsets |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DSM 16+ Offsets 0, 1 SDD | DSM 16+ Offsets 0, 1 FDD | DSM 32+ Offsets 0, 1 SDD | DSM 32+ Offsets 0, 1 FDD | ASM 8/8+ Offsets 0, 1, 2, 3 | | 1 (offset) | 2 (offset) | 3 (offset) | 4 (DS30) | 5 (DS30) | 6 (DS30) | DSM 16+ and DSM 32+ only*** 1 (offset) | 2 (offset) | 3 (offset) | 4 (DS30) | 5 (DS30) | 6 (DS30) | |
| 2 | 0 | 0 | 0 | | 0 | 0*** | on | on | on | on | on | on | off | on | on | on | on | on | 0 |
| | | | | | | 1 | on | on | off | on | on | on | off | on | off | on | on | on | 1 |
| | | 1 | | | | 2 | on | off | on | on | on | on | off | off | on | on | on | on | 2 |
| | | | | | | 3 | on | off | off | on | on | on | off | off | off | on | on | on | 3 |
| 3 | 0 | 0 | | 0 | 0 | 0 | on | on | on | on | on | off | off | on | on | on | on | off | 0 |
| | | | | | | 1 | on | on | off | on | on | off | off | on | off | on | on | off | 1 |
| | | 1 | | | | 2 | on | off | on | on | on | off | off | off | on | on | on | off | 2 |
| | | | | | | 3 | on | off | off | on | on | off | off | off | off | on | on | off | 3 |
| 4 | 0 | 0 | 0 | | 0 | 0 | on | on | on | on | off | on | off | on | on | on | off | on | 0 |
| | | | | | | 1 | on | on | off | on | off | on | off | on | off | on | off | on | 1 |
| | | 1 | | | | 2 | on | off | on | on | off | on | off | off | on | on | off | on | 2 |
| | | | | | | 3 | on | off | off | on | off | on | off | off | off | on | off | on | 3 |
| 5 | 0 | 0 | | 0 | 0 | 0 | on | on | on | on | off | off | off | on | on | on | off | off | 0 |
| | | | | | | 1 | on | on | off | on | off | off | off | on | off | on | off | off | 1 |
| | | 1 | | | | 2 | on | off | on | on | off | off | off | off | on | on | off | off | 2 |
| | | | | | | 3 | on | off | off | on | off | off | off | off | off | on | off | off | 3 |
| 6* | 0 | 0 | 0 | | 0 | 0 | on | on | on | off | on | on | off | on | on | off | on | on | 0 |
| | | | | | | 1 | on | on | off | off | on | on | off | on | off | off | on | on | 1 |
| | | 1 | | | | 2**** | on | off | on | off | on | on | off | off | on | off | on | on | 2 |
| | | | | | | 3*** | on | off | off | off | on | on | off | off | off | off | on | on | 3 |
| 7** | 0 | 0 | | | 0 | 0 | on | on | on | off | on | off | off | on | on | off | on | off | 0 |
| | | | | | | 1 | on | on | off | off | on | off | off | on | off | off | on | off | 1 |
| | | 1 | | | | 2**** | on | off | on | off | on | off | off | off | on | off | on | off | 2 |
| | | | | | | 3*** | on | off | off | off | on | off | off | off | off | off | on | off | 3 |

Module set to offset 0 Module set to offset 1 Module set to offset 2 Module set to offset 3

Each shaded square represents the amount of the DS30 bus, and the offset, which the module requires.

*If your system is configured for Partial double density (PDD), DS30 6 will support only modules set to single density (SDD) and it supports Companion.

**If your system is configured with a 3/5 DS30 split, DS30 7 is not available to media bay modules.
If your system is configured for PDD and a 2/6 DS30 split, DS30 7 supports only single-density modules, but it also supports Companion. (Note: DSM 32/DSM 32+ (set to single density) modules cannot be deployed on this bus.)

***ASM modules always use the single density dip switch settings, with the appropriate offset.

****If your system is set to PDD, offsets 2 and 3 are not available on ASM 8 modules.

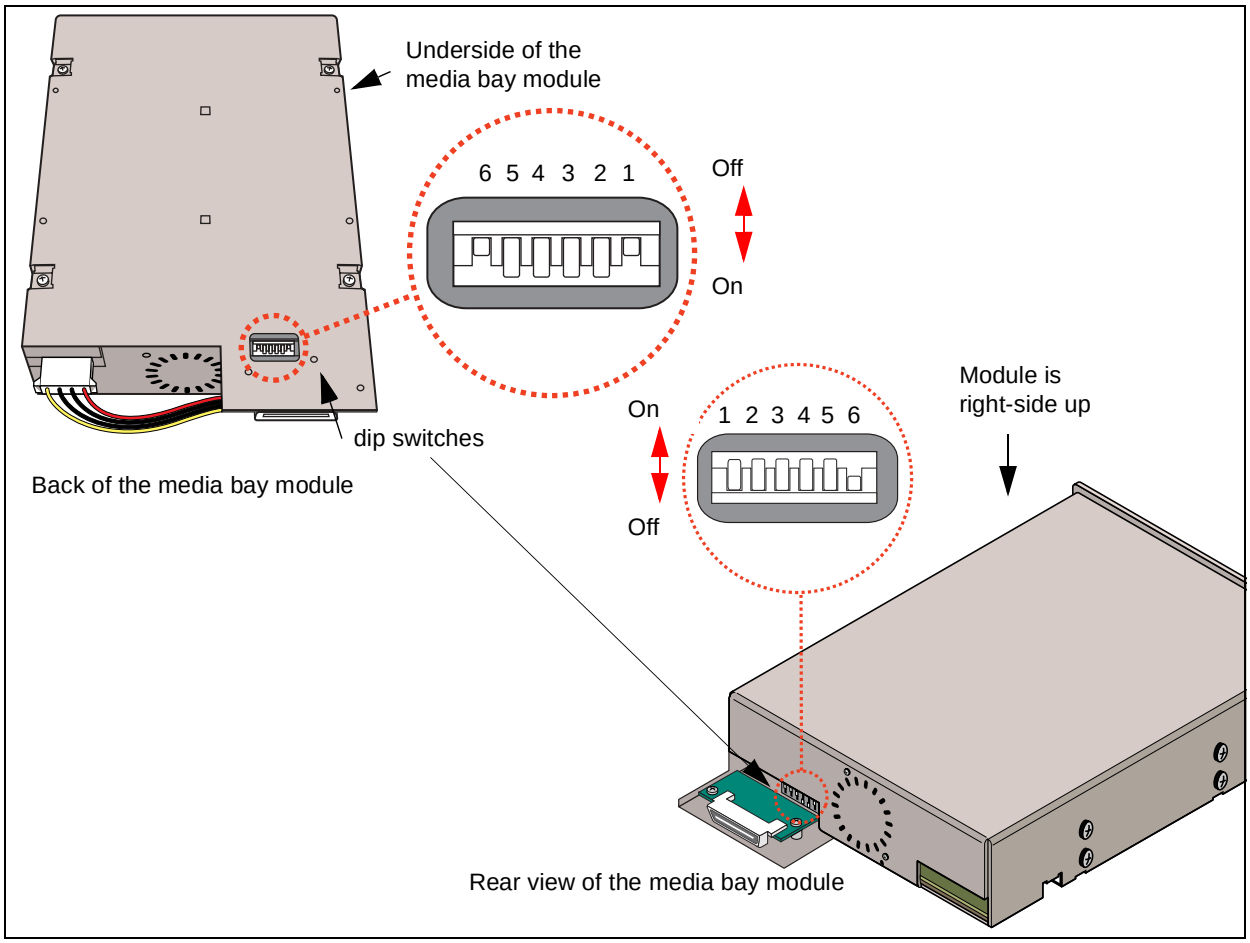
## Module dip switches

Before you install the media bay modules into the Business Communications Manager platform base chassis, you need to set the dip switches. Make a note of these settings either on the chart shown in Table 17 on page 133 or in the Programming Record forms.

Follow these steps to set the dip switches:

1 Locate the dip switches on the module.

**Figure 71** Switches on the media bay module




2 Set the switches to correspond with the settings you chose "Determine module dip switch settings" on page 131.

3 Repeat for each media bay module you want to install.

4 You are now ready to install the modules into the Business Communications Manager platform base chassis or expansion unit. Refer to Chapter 14, “Install Optional Telephony Equipment,” on page 365 for details.

**Tip:** Create a label with the DS30 bus and dip switch settings. Affix the label to the front of the module as a quick reference during maintenance activities.

5 This procedure is complete.

# Assign Line and Extension Numbers for Specific Modules

The switch settings on the media bay module determine the line numbers and extension numbers the modules use. The tables in this section show the correspondence between DS30 numbers, switch settings, and the line/extension numbers for each type of module. The DS30 number and switch settings correspond with Table 17 on page 133.

## DTM switch settings

Although DTMs have more than 16 lines, they occupy only one DS30 bus per DTM.

Table 18 shows the switch settings for each DS30 bus, and the resulting line assignments.

**Table 19** DTM switch settings (T1)

| Select DS30 bus | Enter these switch settings | | | | | | To assign these lines |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | |
| 2 | on | on | on | on | on | on | 211-234 |
| 3 | on | on | on | on | on | off | 181-204 |
| 4 | on | on | on | on | off | on | 151-174 |
| 5 | on | on | on | on | off | off | 121-144 |
| 6 | on | on | on | off | on | on | 91-114 |
| ***7 | on | on | on | off | on | off | 61-84 |

***If your system is configured with a 3/5 DS30 channel split, DS30 7 is not available.

Table 20 shows the switch settings for each DS30 bus, and the resulting line assignments.

**Table 20** DTM switch settings (North American PRI)

| Select DS30 bus | Enter these switch settings | | | | | | To assign these lines |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | |
| 2 | on | on | on | on | on | on | 211-233 |
| 3 | on | on | on | on | on | off | 181-203 |
| 4 | on | on | on | on | off | on | 151-173 |
| 5 | on | on | on | on | off | off | 121-143 |
| 6 | on | on | on | off | on | on | 91-113 |
| ***7 | on | on | on | off | on | off | 61-83 |

***If your system is configured with a 3/5 DS30 channel split, DS30 7 is not available.

Table 21 shows the switch settings for each DS30 bus, and the resulting line assignments.

**Table 21** DTM switch settings (E1 and UK PRI)

| Select DS30 bus | Enter these switch settings | | | | | | To assign these lines |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | |
| 2 | on | on | on | on | on | on | 211-240 |
| 3 | on | on | on | on | on | off | 181-210 |
| 4 | on | on | on | on | off | on | 151-180 |
| 5 | on | on | on | on | off | off | 121-150 |
| 6 | on | on | on | off | on | on | 91-120 |
| ***7 | on | on | on | off | on | off | 61-90 |

***If your system is configured with a 3/5 DS30 channel split, DS30 channel 7 is not available.

## DDIM switch settings

The DDIM module combines a DTM and a data module. The switch setting you choose determines the DS30 channel assigned to the DTM portion of the DDIM. The data module is automatically assigned the next DS30 channel number.

The DS30 channel you assign to the DDIM determines the line numbers of the T1 line connected to the DDIM. Table 22 shows the switch settings for each DS30 channel, and the resulting line assignments.

**Table 22** DDIM switch settings

| Select DS30 bus | Enter these switch settings | | | | | | To assign these lines | Data Module DS30 channel |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | | |
| 2 | on | on | on | on | on | on | 211-234 | 3 |
| 3 | on | on | on | on | on | off | 181-204 | 4 |
| 4 | on | on | on | on | off | on | 151-174 | 5 |
| 5 | on | on | on | on | off | off | 121-144 | 6 |
| 6 | on | on | on | off | on | on | 91-114 | 7* |
| 7 | | | | | | | | ** |

* If your system is configured with a 3/5 DS30 channel split, you cannot use DS30 channel 6 for the DDIM. When you use a 3/5 split, DS30 channel 7 is not available for the data module portion of the DDIM.

** You cannot use DS30 channel 7 for the DDIM. If you assign DS30 channel 7, there is no DS30 channel available for the data module portion of the DDIM.

## BRI switch settings

You can install a maximum of three BRI modules per DS30 bus on the offsets indicated in Table 23. Table 23 shows the switch settings for each DS30 number, and the resulting line assignments.

**Table 23** BRIM S/T switch settings

| Select DS30 bus | Select offset | Enter these switch settings 1 | 2 | 3 | 4 | 5 | 6 | To assign these lines |
|---|---|---|---|---|---|---|---|---|
| 2 | 0 | on | on | on | on | on | on | 211-218 |
| | 1 | on | on | off | on | on | on | 219-226 |
| | 2 | on | off | on | on | on | on | 227-234 |
| 3 | 0 | on | on | on | on | on | off | 181-188 |
| | 1 | on | on | off | on | on | off | 189-196 |
| | 2 | on | off | on | on | on | off | 197-204 |
| 4 | 0 | on | on | on | on | off | on | 151-158 |
| | 1 | on | on | off | on | off | on | 159-166 |
| | 2 | on | off | on | on | off | on | 167-174 |
| 5 | 0 | on | on | on | on | off | off | 121-128 |
| | 1 | on | on | off | on | off | off | 129-136 |
| | 2 | on | off | on | on | off | off | 137-144 |
| 6 | 0 | on | on | on | off | on | on | 91-98 |
| | 1 | on | on | off | off | on | on | 99-106 |
| | 2 | on | off | on | off | on | on | 107-114 |
| ***7 | 0 | on | on | on | off | on | off | 61-68 |
| | 1 | on | on | off | off | on | off | 69-76 |
| | 2 | on | off | on | off | on | off | 77-84 |

***If your system is configured with a 3/5 DS30 channel split, DS30 channel 7 is not available.

## CTM switch settings

There are two models of CTMs.

- CTMs have four lines, therefore, you can add a maximum of four CTMs per DS30 bus.
- CTM8s have eight lines. This module uses two offset settings per module. Therefore, you can add a maximum of two CTM8 modules per DS30 bus.
- You can also mix the two modules. For instance, if you have two existing CTM modules with offset 0 and 1, you can add a CTM8 on offset 2.

**CTM4:** The CTM4 provides connections for four analog calling line identification (CLID) PSTN lines. Each voice line uses one line in the offset. Since each DS30 channel has four lines per offset, you can assign a maximum of four CTMs to a single DS30 bus by making the offset switch settings different for each module. You can also combine three CTMs with the trunk module part of the 4X16 module on the same DS30 bus.

**CTM8:** The CTM8 provides connections for eight analog calling line identification (CLID) PSTN lines. Each line uses one voice line. Since each DS30 bus has four lines per offset, you require two offsets for each module. You can assign a maximum of two CTM8s to a DS30 bus, by making the offset switch settings different for each module.

You can also combine a CTM8 with a 4X16 module on the same DS30 number.
When you choose an offset number for the CTM8, the system automatically adds the next offset number. You cannot assign offset 3 to the CTM8 module, because this does not allow the module to assign the second set of lines.

Table 24 shows the switch settings for each DS30 number, and the resulting line assignments for CTMs and CTM8s.

**Table 24** CTM and CTM8 switch settings

| Select DS30 bus | Select offset | Enter these switch settings | | | | | | To assign these lines CTM | To assign these lines. CTM8 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | | Lower (Lines 1-4) | Upper (lines 5-8) |
| 2 | 0 | on | on | on | on | on | on | 211-214 | 211-214 | 219-222 |
| | 1 | on | on | off | on | on | on | 219-222 | 219-222 | 227-230 |
| | 2 | on | off | on | on | on | on | 227-230 | 227-230 | 235-238 |
| | 3 | on | off | off | on | on | on | 235-238 | Not supported | Not supported |
| 3 | 0 | on | on | on | on | on | off | 181-184 | 181-184 | 189-192 |
| | 1 | on | on | off | on | on | off | 189-192 | 189-192 | 197-200 |
| | 2 | on | off | on | on | on | off | 197-200 | 197-200 | 205-208 |
| | 3 | on | off | off | on | on | off | 205-208 | Not supported | Not supported |
| 4 | 0 | on | on | on | on | off | on | 151-154 | 151-154 | 159-162 |
| | 1 | on | on | off | on | off | on | 159-162 | 159-162 | 167-170 |
| | 2 | on | off | on | on | off | on | 167-170 | 167-170 | 175-178 |
| | 3 | on | off | off | on | off | on | 175-178 | Not supported | Not supported |
| 5 | 0 | on | on | on | on | off | off | 121-124 | 121-124 | 129-132 |
| | 1 | on | on | off | on | off | off | 129-132 | 129-132 | 137-140 |
| | 2 | on | off | on | on | off | off | 137-140 | 137-140 | 145-148 |
| | 3 | on | off | off | on | off | off | 145-148 | Not supported | Not supported |
| 6 | 0 | on | on | on | off | on | on | 91-94 | 91-94 | 99-102 |
| | 1 | on | on | off | off | on | on | 99-102 | 99-102 | 107-110 |
| | 2 | on | off | on | off | on | on | 107-110 | 107-110 | 115-118 |
| | 3 | on | off | off | off | on | on | 115-118 | Not supported | Not supported |
| ***7 | 0 | on | on | on | off | on | off | 61-64 | 61-64 | 69-72 |
| | 1 | on | on | off | off | on | off | 69-72 | 69-72 | 77-80 |
| | 2 | on | off | on | off | on | off | 77-80 | 77-80 | 85-88 |
| | 3 | on | off | off | off | on | off | 85-88 | Not supported | Not supported |

***If your system is configured with a 3/5 DS30 channel split, DS30 channel 7 is not available.

## GATM switch settings

There are two models of GATM:

**GATM 4:** The GATM 4 provides connections for four analog calling line identification (CLID) or Supervision Disconnect PSTN lines. Each voice line uses one line in the DS30 bus offset. Because each DS30 bus has four lines per offset, you can assign a maximum of four GATM4s to a single DS30 bus by making the offset switch settings different for each module.

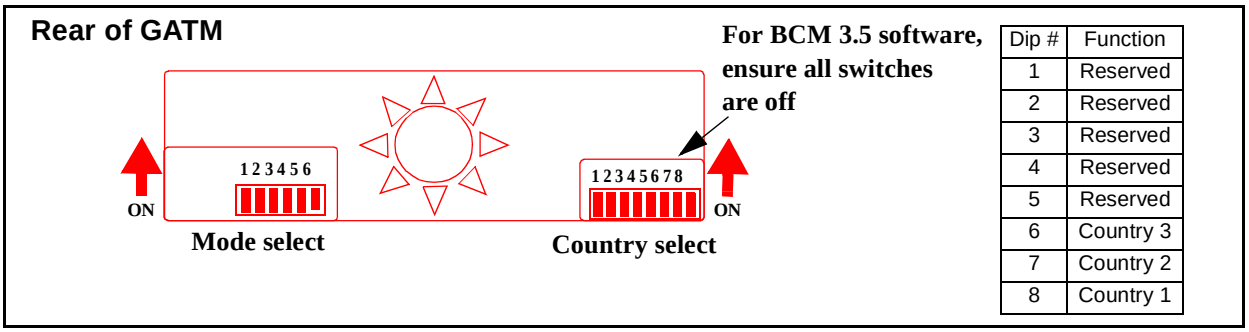
**GATM 8:** The GATM 8 provides connections for eight analog calling line identification (CLID) or Supervision Disconnect PSTN lines. Each line uses one line in the DS30 bus offset. Since each DS30 bus has four lines per offset, you require two offsets for each GATM 8. You can assign a maximum of two GATM 8s to a DS30 bus, by making the offset switch settings different for each module.

You can also combine a GATM 8 with a 4X16 module on the same DS30 number. When you choose an offset number for the GATM 8, the system automatically adds the next offset number. You cannot assign offset 3 to the GATM 8 module, because this does not allow the module to assign the second set of lines.

There are two sets of dip switches located on the rear of the GATM module.

The left set allows you to determine the DS30 bus and offset for the module.

The right set of switches allows you to manually configure a country profile operation, which is required for earlier versions of software. However, BCM 3.6 software supports downloadable firmware for the module for the North America, Taiwan, UK and Australia telephony profiles. To allow the GATM to download the parameters for these countries and to allow for firmware upgrades, set all the country dip switches to 0 (zero/off) (factory default). The MSC telephony profile you choose must support the appropriate country setting to ensure that the correct firmware installs.




| Dip # | Function |
|---|---|
| 1 | Reserved |
| 2 | Reserved |
| 3 | Reserved |
| 4 | Reserved |
| 5 | Reserved |
| 6 | Country 3 |
| 7 | Country 2 |
| 8 | Country 1 |

| Country select dip switch settings | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 1 | 2 | 3 | 4 | 5 | 6 | 78 | | | | |
| **Setting for automatic downloads (all countries)** | | | | | | | | | **Manual settings (pre-BCM 3.5 systems)** | | | | | | | | | | |
| off | off | off | off | off | off | off | off | Download based on profile | off | off | off | off | off | off | off | on | North America (600 ohms) | | |
| | | | | | | | | | off | off | off | off | off | off | on | off | Taiwan | | |
| | | | | | | | | | off | off | off | off | off | off | on | on | Australia | | |
| | | | | | | | | | off | off | off | off | off | on | off | off | United Kingdom | | |
| | | | | | | | | | off | off | off | off | off | on | off | on | North America (900 ohms) | | |

The following table lists the possible dip switch settings for the GATM Mode Select dip switches.

| Mode select dip switch settings | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DS30 bus #** | **Off-sets** | **Offset positions** | | | **Dip switch settings** | | | | | | | **DS30 bus #** | **Off-sets** | **Offset positions** | | | **Dip switch settings** | | | | | | |
| | | **GATM4 Offsets 0, 1, 2, 3** | **GATM8 Offsets 0, 1, 2** | | **1 2 3 (offset) 4 5 6 (DS30 #)** | | | | | | | | | **GATM4 Offsets 0, 1, 2, 3** | **GATM8 Offsets 0, 1, 2** | | **1 2 3 (offset) 4 5 6 (DS30 #)** | | | | | | |
| **2** | 0 | 0 | 0 | | on | on | on | on | on | on | | **5** | 0 | 0 | 0 | | on | on | on | on | off | off | |
| | 1 | 1 | | 1 | on | on | off | on | on | on | | | 1 | 1 | | 1 | on | on | off | on | off | off | |
| | 2 | 2 | 2 | | on | off | on | on | on | on | | | 2 | 2 | 2 | | on | off | on | on | off | off | |
| | 3 | 3 | | | on | off | off | on | on | on | | | 3 | 3 | | | on | off | off | on | off | off | |
| **3** | 0 | 0 | 0 | | on | on | on | on | on | off | | **6** | 0 | 0 | 0 | | on | on | on | off | on | on | |
| | 1 | 1 | | 1 | on | on | off | on | on | off | | | 1 | 1 | | 1 | on | on | off | off | on | on | |
| | 2 | 2 | 2 | | on | off | on | on | on | off | | | 2 | 2 | 2 | | on | off | on | off | on | on | |
| | 3 | 3 | | | on | off | off | on | on | off | | | 3 | 3 | | | on | off | off | off | on | on | |
| **4** | 0 | 0 | 0 | | on | on | on | on | off | on | | **7*** ** | 0 | 0 | 0 | | on | on | on | off | on | off | |
| | 1 | 1 | | 1 | on | on | off | on | off | on | | | 1 | 1 | | 1 | on | on | off | off | on | off | |
| | 2 | 2 | 2 | | on | off | on | on | off | on | | | 2 | 2 | 2 | | on | off | on | off | on | off | |
| | 3 | 3 | | | on | off | off | on | off | on | | | 3 | 3 | | | on | off | off | off | on | off | |

## 4X16 switch settings

The 4x16 module combines a CTM and a DSM 16. The CTM only requires four lines on the DS30 bus. Therefore, it can be assigned any of the four offsets in a DS30 bus. The DSM module then automatically assigns the next DS30 number and all the assigned DNs.

This module can be combined with three other CTMs or one CTM8 on the same DS30 bus.

Table 25 shows the switch settings for each DS30 bus, and the assigned lines and dialing numbers (DNs) for each DS30 bus.

**Table 25** 4x16 switch settings

| DS30 bus | Offset | Enter these switch settings | | | | | | To assign these lines | And this DS30 and DNs | **Custom DN range |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | | | |
| 2 | 0 | on | on | on | on | on | on | 211-214 | DS30 3 237-252 | |
| | 1 | on | on | off | on | on | on | 219-222 | | |
| | 2 | on | off | on | on | on | on | 227-230 | | |
| | 3 | on | off | off | on | on | on | 235-238 | | |
| 3 | 0 | on | on | on | on | on | off | 181-184 | DS30 4 253-268 | |
| | 1 | on | on | off | on | on | off | 189-192 | | |
| | 2 | on | off | on | on | on | off | 197-200 | | |
| | 3 | on | off | | on | on | off | 205-208 | | |
| 4 | 0 | on | on | on | on | off | on | 151-154 | DS30 5 269-284 | |
| | 1 | on | on | off | on | off | on | 159-162 | | |
| | 2 | on | off | on | on | off | on | 167-170 | | |
| | 3 | on | off | off | on | off | on | 175-178 | | |
| 5 | 0 | on | on | on | on | off | off | 121-124 | DS30 6 285-300 | |
| | 1 | on | on | off | on | off | off | 129-132 | | |
| | 2 | on | off | on | on | off | off | 137-140 | | |
| | 3 | on | off | off | on | off | off | 145-148 | | |
| 6 | 0 | on | on | on | off | on | on | 91-94 | DS30 7*** 301-316 | |
| | 1 | on | on | off | off | on | on | 99-102 | | |
| | 2 | on | off | on | off | on | on | 107-110 | | |
| | 3 | on | off | off | off | on | on | 115-118 | | |
| ***7 | | on | on | on | off | on | off | Not supported | | |
| | | on | on | off | off | on | off | | | |
| | | on | off | on | off | on | off | | | |
| | | on | off | off | off | on | off | | | |

** The extensions listed are based on a three-digit DN with a Start DN of 221. If your system has longer DNs or a different Start DN, enter the range in the blank column.

*** If your system is configured with a 3/5 DS30 channel split, you cannot configure this module for DS30 6 since DS30 7 is not available for the second level.

## ASM 8 and ASM 8+ switch settings

In a single-density configuration, such as for DS30 6 or 7 when they are set to the default PDD, only offset 1 and 2 are available to ASM 8s. In a double-density configuration, you can install four ASM 8s for each DS30 bus. Table 25 shows the switch settings for each DS30 number and the dialing numbers (DNs) assigned to each DS30 number.

**Table 26** ASM 8 settings

| Select bus | Select offset | Enter these switch settings 1 | 2 | 3 | 4 | 5 | 6 | To assign these DNs | Select offset | Enter these switch settings 1 | 2 | 3 | 4 | 5 | 6 | To assign these DNs | **Custom DN range |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **2.5 system upgraded to 3.0** | | | | | | | | **3.0, 3.5, 3.6 systems** | | | | | | | | |
| 2 | 0 | on | on | on | on | on | on | 221-228 | 0 | on | on | on | on | on | on | 221-228 | |
| | 1 | on | on | off | on | on | on | 229-236 | 1 | on | on | off | on | on | on | 229-236 | |
| | 2 | on | off | on | on | on | on | 377-384 | 2 | on | off | on | on | on | on | 237-244 | |
| | 3 | on | off | off | on | on | on | 385-392 | 3 | on | off | off | on | on | on | 245-252 | |
| 3 | 0 | on | on | on | on | on | off | 237-244 | 0 | on | on | on | on | on | off | 253-260 | |
| | 1 | on | on | off | on | on | off | 245-252 | 1 | on | on | off | on | on | off | 261-268 | |
| | 2 | on | off | on | on | on | off | 393-400 | 2 | on | off | on | on | on | off | 269-276 | |
| | 3 | on | off | off | on | on | off | 401-408 | 3 | on | off | off | on | on | off | 277-284 | |
| 4 | 0 | on | on | on | on | off | on | 253-260 | 0 | on | on | on | on | off | on | 285-292 | |
| | 1 | on | on | off | on | off | on | 261-268 | 1 | on | on | off | on | off | on | 293-300 | |
| | 2 | on | off | on | on | off | on | 409-416 | 2 | on | off | on | on | off | on | 301-308 | |
| | 3 | on | off | off | on | off | on | 417-424 | 3 | on | off | off | on | off | on | 309-316 | |
| 5 | 0 | on | on | on | on | off | off | 269-276 | 0 | on | on | on | on | off | off | 317-324 | |
| | 1 | on | on | off | on | off | off | 277-284 | 1 | on | on | off | on | off | off | 325-332 | |
| | 2 | on | off | on | on | off | off | 425-432 | 2 | on | off | on | on | off | off | 333-340 | |
| | 3 | on | off | off | on | off | off | 433-440 | 3 | on | off | off | on | off | off | 341-348 | |
| 6 | 0 | on | on | on | off | on | on | 285-292 | 0 | on | on | on | off | on | on | 349-356 | |
| | 1 | on | on | off | off | on | on | 293-300 | 1 | on | on | off | off | on | on | 357-364 | |
| | ****2 | on | off | on | off | on | on | 441-448 | ****2 | on | off | on | off | on | on | 365-372 | |
| | ****3 | on | off | off | off | on | on | 449-456 | ****3 | on | off | off | off | on | on | 373-380 | |
| 7*** | 0 | on | on | on | off | on | off | 301-308 | 0 | on | on | on | off | on | off | 381-388 | |
| | 1 | on | on | off | off | on | off | 309-316 | 1 | on | on | off | off | on | off | 389-396 | |
| | *****2 | on | off | on | off | on | off | 457-464 | *****2 | on | off | on | off | on | off | 397-404 | |
| | *****3 | on | off | off | off | on | off | 465-472 | *****3 | on | off | off | off | on | off | 405-412 | |

** The extensions listed are based on a three-digit DN with a Start DN of 221. If your system has longer DNs or a different Start DN, enter the range in the blank column.

*** If your system is configured with a 3/5 channel split, DS30 7 is not available.

****Available only on systems set to FDD.

*****Available only on systems set to FDD, with a 2/6 DS30 split.

### ASM8+ country switch settings

The ASM8+ has a second set of eight dip switches on the right side, at the rear of the module, that allow you to choose a country setting and three modes of function.

- Switch 1: firmware download capability
  - off=No firmware downloads (for systems running BCM 3.5 and previous software
  - on = allow firmware downloads (for systems running BCM 3.6 and newer software)
- Switch 2: when to download firmware:
  - off = download firmware based on version
  - on = download firmware at cold start
- Switch 3: echo cancellation
  - off=echo cancellation enabled (default)
  - on=echo cancellation disabled
- Switch 4-8: country settings

Refer to Table 27 for detailed switch settings.

**Table 27** ASM8+ country select dip switch settings

| Manual settings (pre-BCM 3.6 systems) | | | | | | | | Country profile | Manual settings (BCM 3.6 and newer systems) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| off | off | off | off | off | off | off | off | North America | on | off | off | off | off | off | off | off |
| off | off | off | off | off | off | off | on | United Kingdom | on | off | off | off | off | off | off | on |

## DSM switch settings

There are two types of DSMs:

- DSM 16s have one connector which connects to 16 lines (telephones). These modules require a full DS30 number each (single density), or half a bus (double density).
- DSM32s have two connectors, each of which connects to 16 lines (telephones). These modules require two full, consecutive DS30 numbers (single density) or one full bus (double density).

This section includes these charts:


- "DSM 16/DSM 32 single-density switch settings (upgraded system)" on page 145
- "DSM16+ and DSM 32+ double density switch settings (upgraded system)" on page 146
- "DSM16/DSM 32 single density switch settings (new system)" on page 147
- "DSM16+ and DSM 32+ double density switch settings (new system)" on page 148

## DSM 16/DSM 32 single-density switch settings (upgraded system)

The following table shows the switch settings for DSM modules deployed as single density on a system. For single-density modules, you set the first DS30 number on the dip switches and the system assigns the next DS30 bus. Note in Table 28 how the DSM32 module spans two DS30 bus numbers and that there are only five possible DS30 settings for the dip switches.

**Note:** DSM modules deployed with 2.5 systems are all single density and cannot be set to double density. The DSM 16+ and DSM 32+ modules can be set to either density.

Note that Companion sets can only be assigned on DS30 6 and 7, and the handsets have a different set of default DNs than the digital sets. Also, Companion can only be deployed on systems that remain at Part Double Density (PDD), the default condition of 3.0 systems.

**Table 28** DSM 16/DSM 16+ and DSM 32/DSM 32+ single-density switch settings (upgraded system)

| Select DS30 bus | Enter these switch settings | | | | | | **To assign these DNs to DSM16 or DSM 16+ | To assign these DNs to DSM 32 or DSM 32+ | To assign these DNs to Companion |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | | | |
| 2 | on | on | on | on | on | on | 221-236 | 221-252 (DS30 2 and 3) | N/A |
| 3 | on | on | on | on | on | off | 237-252 | 237-268 (DS30 3 and 4) | |
| 4 | on | on | on | on | off | on | 253-268 | 253-284) (DS30 4 and 5) | |
| 5 | on | on | on | on | off | off | 269-284 | 269-300 (DS30 5 and 6) | |
| 6 | on | on | on | off | on | on | 285-300 | 285-316 (DS30 6 and 7) | 565-580**** **(PDD only)** |
| ***7 | on | on | on | off | on | off | 301-316 | N/A | 581-596**** **(PDD only)** |

**The extensions listed are based on a three-digit DN with a Start DN of 221. If your system has longer DNs or a different Start DN, enter the range in the blank column.

***If your system is configured with a 3/5 DS30 channel split, you cannot use DS30 7 for the DSM 16 module. You cannot configure the DSM 32 module for DS30 6 because the second set of DNs cannot be accessed.

****If you need more DNs for Companion sets, use the range that starts at 597 (ISDN or DECT) and change the DN type to NA Portable.

*****If you system is set to Full Double Density (FDD), Companion telephones are not supported.

## DSM16+ and DSM 32+ double density switch settings (upgraded system)

The following table shows the switch settings for DSM-plus modules deployed as double density on a system that has been upgraded from BCM 2.5 to BCM 3.0 or later software.

**Note:** DSM modules deployed with BCM 2.5 systems are all single density and cannot be set to double density. The DSM 16+ and DSM32+ modules can be set to either density.

Companion has not be included in this table because you cannot use modules set to double density to deploy Companion.

**Table 29** DSM 16+ and DSM32+ double density switch settings (upgraded system)

| Select DS30 bus | Enter these switch settings | | | | | | | **To assign these DNs to DSM 16+: (A= DSM1, B=DSM2) | | To assign these DNs to DSM 32+ (connectors: A=top, B = bottom) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | | | | | |
| 2 | off | on | on | on | on | on | A | 221-236 | A | 377-392 | |
| | off | on | off | on | on | on | B | 377-392 | B | | 221-236 |
| 3 | off | on | on | on | on | off | A | 237-252 | A | 393-408 | |
| | off | on | off | on | on | off | B | 393-408 | B | | 237-252 |

**Table 29** DSM 16+ and DSM32+ double density switch settings (upgraded system)

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **4** | off | on | on | on | off | on | A | 253-268 | A | 409-424 | |
| | off | on | off | on | off | on | B | 409-424 | B | | 253-268 |
| **5** | off | on | on | on | off | off | A | 269-284 | A | 425-440 | |
| | off | on | off | on | off | off | B | 425-440 | B | | 269-284 |
| **6** | off | on | on | off | on | on | A | 285-300 | A | 441-456**** | |
| | off | on | off | off | on | on | B | 441-456**** | B | | 285-300 |
| ***7** | off | on | on | off | on | off | A | 301-316 | A | 457-472***** | |
| | off | on | off | off | on | off | B | 457-472***** | B | | 301-316***** |

**The extensions listed are based on a three-digit DN with a Start DN of 221. If your system has longer DNs or a different Start DN, enter the range in the blank column.

***If your system is configured with a 3/5 channel split, you cannot use DS30 7 for the DSM 16 module.

****Available only on systems set to FDD. Modules cannot be set to double density on systems set to PDD. Refer to the previous chart for the switch settings for single density and PDD.

*****Available only on systems set to FDD, with a 2/6 DS30 split. Modules cannot be set to double density on systems set to PDD. Refer to the previous chart for the switch settings for single density and PDD.

## DSM16/DSM 32 single density switch settings (new system)

The following table shows the switch settings for DSM modules deployed as single density on a new system running BCM 3.0 or later software.

**Note:** DSM modules deployed prior to BCM 3.0 are all single density and cannot be set to double density, but they can still be used on new systems. The DSM 16+ and DSM32+ modules can be set to either density.

Note that Companion sets can only be assigned on DS30 6 and 7, and the handsets have a different set of default DNs than the digital sets. Also, Companion can only be deployed on systems that remain at Part Double Density (PDD), the default condition of 3.0 systems.

**Table 30** DSM 16/DSM 16+ and DSM 32/DSM32+ single density switch settings (new system)

| Select DS30 bus | Enter these switch settings | | | | | | **To assign these DNs to DSM 16 or DSM 16+ | To assign these DNs to DSM 32 or DSM 32+ | | To assign these DNs to Companion |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | | Top | Bottom | |
| **2** | on | on | on | on | on | on | 221-236 | 253-268 | 221-236 | N/A |
| **3** | on | on | on | on | on | off | 253-268 | 285-300 | 253-268 | |
| **4** | on | on | on | on | off | on | 285-300 | 317-332 | 285-300 | |
| **5** | on | on | on | on | off | off | 317-332 | 349-364 | 317-332 | |
| **6** | on | on | on | off | on | on | 349-364 | 381-396 | 349-364 | 565-580**** **(PDD only)** |
| ***7** | on | on | on | off | on | off | 381-396 | N/A | | 581-596**** **(PDD only)** |

**Table 30** DSM 16/DSM 16+ and DSM 32/DSM32+ single density switch settings (new system)

| |
|---|
| **The extensions listed are based on a three-digit DN with a Start DN of 221. If your system has longer DNs or a different Start DN, enter the range in the blank column.<br>***If your system is configured with a 3/5 channel split, you cannot use DS30 7 for the DSM 16 module. You cannot configure the DSM32 module for DS30 6 because the second set of DNs cannot be accessed.<br>****If you need more DNs for Companion sets, use the range that starts at 597 (ISDN or DECT) and change the DN type to NA Portable.<br>*****If you system is set to Full Double Density (FDD), Companion telephones are not supported. |

## DSM16+ and DSM 32+ double density switch settings (new system)

The following table shows the switch settings for DSM-plus modules deployed as double density on a new system (BCM 3.0 or later software).

**Note:** DSM modules deployed prior to BCM 3.0 are all single density and cannot be set to double density, but they can still be used on new systems. The DSM 16+ and DSM32+ modules can be set to either density.

Companion has not be included in this table because you cannot use double density modules to deploy Companion.

**Table 31** DSM 16+ and DSM32+ double density switch settings (new system)

| Select DS30 bus | Enter these switch settings | | | | | | | To assign these DNs to DSM 16+: A= DSM1, B=DSM2 | | To assign these DNs to DSM 32+ (connectors: A=top, B = bottom) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | | | | | |
| 2 | off | on | on | on | on | on | A | 221-236 | A | 237-252 | |
| | off | on | off | on | on | on | B | 237-252 | B | | 221-236 |
| 3 | off | on | on | on | on | off | A | 253-268 | A | 269-284 | |
| | off | on | off | on | on | off | B | 269-284 | B | | 253-268 |
| 4 | off | on | on | on | off | on | A | 285-300 | A | 301-316 | |
| | off | on | off | on | off | on | B | 301-316 | B | | 285-300 |
| 5 | off | on | on | on | off | off | A | 317-332 | A | 333-348 | |
| | off | on | off | on | off | off | B | 333-348 | B | | 317-332 |
| 6 | off | on | on | off | on | on | A | 349-364 | A | 365-380**** | |
| | off | on | off | off | on | on | B | 365-380**** | B | | 349-364 |
| ***7 | off | on | on | off | on | off | A | 381-396 | A | 397-412***** | |
| | off | on | off | off | on | off | B | 397-412***** | B | | 381-396 |

**The extensions listed are based on a three-digit DN with a Start DN of 221. If your system has longer DNs or a different Start DN, enter the range in the blank column.

***If your system is configured with a 3/5 channel split, you cannot use DS30 7.

****Available only on systems set to FDD. Modules cannot be set to double density on systems set to PDD. Refer to the previous chart for the switch settings for single density and PDD.

*****Available only on systems set to FDD, with a 2/6 DS30 split. Modules cannot be set to double density on systems set to PDD. Refer to the previous chart for the switch settings for single density and PDD.

## DECT switch settings

The DECT module supports a maximum of eight DECT radio base station connections. This module occupies one full DS30 bus, which can support a maximum of 32 cordless handsets when all eight base stations are deployed. The DECT module should be installed on DS30 6 or 7.

For detailed instructions about using the DECT module, refer to the *Business Communications Manager 3.0 DECT Installation and Maintenance Guide*.

Table 32 shows the settings for DS30 6 and 7, and the assigned dialing numbers (DNs).

**Table 32** DECT module settings

| Select DS30 bus | Select offset | Set the switches | | | | | | Use these DNs on 3.0 system | Use these DNs on updated 2.0 system | **Custom DN range |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Offset | | | DS30 channel | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | | | |
| 6 | 0 | on | on | on | off | on | on | 597-624* | 501-532* | |
| 7*** | 0 | on | on | on | off | on | off | 597-624* | 501-532* | |

*If you need more DNs, use DNs in the 565 to 596 range. Ensure no other devices are assigned to these DNs before you use them. Change the DN type field to ISDN and DECT.

**The extensions listed are based on a three-digit DN with a Start DN of 221. If your system has longer DNs or a different Start DN, enter the range in the blank column.

***If your system is configured with a 3/5 channel split, DS30 7 is not available.

## FEM switch settings

The dip switches on the underside of the FEM are used to turn the six ports on the front of the module on or off. You need to turn a port on for each Norstar expansion module you want to connect to the Business Communications Manager. Each port also occupies one full DS30 channel. Therefore, if you have a fully-configured, six-module Norstar system to convert, you need to turn on all six ports on the FEM, and, therefore, no other module can be installed in the Business Communications Manager.

**Note:** The FEM module only supports connections to the Norstar trunk and station expansion modules.

To turn on a fiber port, set the dip switch for the corresponding DS30 bus, as shown in Table 33.

For example, if you want to use fiber port 2, turn on dip switch 2 (DS30 3). After the module is installed, an LED lights beside each active fiber port.

Table 33 shows the switch for each fiber port.

**Table 33** FEM switch settings

| Choose a port to turn on | Set this switch to turn on the port | | | | | | This DS30 bus gets assigned |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | |
| 1 | ON | | | | | | 2 |
| 2 | | ON | | | | | 3 |
| 3 | | | ON | | | | 4 |
| 4 | | | | ON | | | 5 |
| 5 | | | | | ON | | 6 |
| 6 | | | | | | ON | 7*** |
| ***If your system is configured with a 3/5 channel split, DS30 7 is not available. | | | | | | | |

**Note:** If you turn on all six switches, you are using all the DS30 numbers. In this case, the Business Communications Manager can support only the FEM module. All other media bays must be empty.

**Warning:** Do not attempt to turn on ports requiring a DS30 bus that is already in service to another media bay module located on the same Business Communications Manager. Doing this results in unpredictable behavior with both modules.

# Install a Media Bay Module

This section provides preparatory and installation procedures for media bay modules and contains the following information:


- "Shut down the system" on page 151
- "Install a media bay module in the Business Communications Manager platform base chassis" on page 152
- "Install a media bay module in the expansion unit" on page 153
- "Reconnect the equipment" on page 153

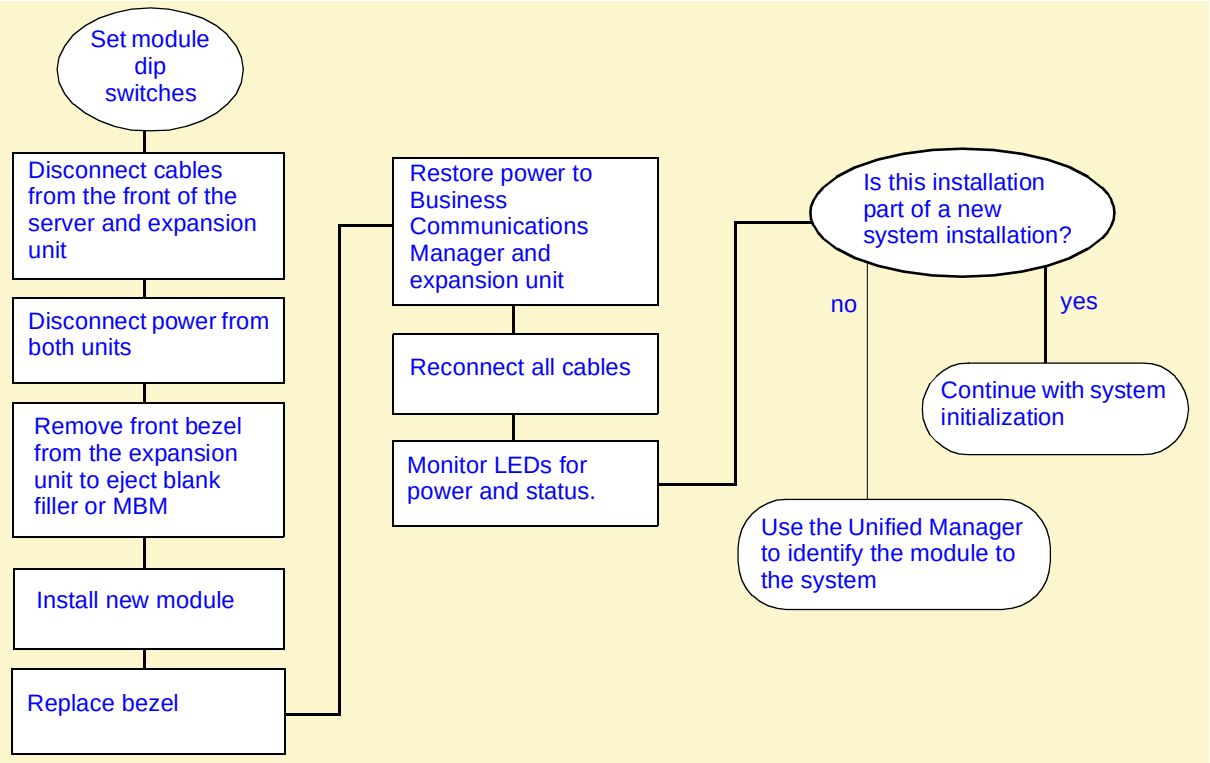

After you set the switches on the media bay modules, you can install them in the Business Communications Manager or the expansion unit.

The BCM200 platform accommodates a maximum of two media bay modules. The BCM400 platform accomodates a maximum of four media bay modules. If your BCM400 system requires more than four media bay modules, you need to connect a Business Communications Manager expansion unit to the Business Communications Manager.

Figure 72 provides an overview of the process for installing media bay modules.

**Note:** The number of media bay modules you can add varies, depending on the DS30 resources that are available. Refer to Table 14 on page 119.

**Figure 72** Overview of installing a media bay module


Set module dip switches
Disconnect cables from the front of the server and expansion unit
Disconnect power from both units
Remove front bezel from the expansion unit to eject blank filler or MBM
Install new module
Replace bezel
Restore power to Business Communications Manager and expansion unit
Reconnect all cables
Monitor LEDs for power and status.
Is this installation part of a new system installation?
no
yes
Continue with system initialization
Use the Unified Manager to identify the module to the system

## Shut down the system

Before you perform any maintenance procedures, read the following warnings to ensure you and your system are properly protected.

**Warning:** If you are installing a new system, or new Business Communications Manager or expansion unit, refer to Chapter 11, “Install Telephones and Peripherals,” on page 317 for instructions about installing a new system before you connect the system to the ac power outlet.

**Warning:** Failure to follow procedures to properly disconnect the Business Communications Manager and expansion unit, can result in module or system damage.

**Warning:** Ensure you are properly grounded before handling modules or any components that are part of the Business Communications Manager hardware.

This section describes the recommended procedure for shutting down the Business Communications Manager prior to installing new media bay modules.

1. If you are adding or replacing a module in an active system, follow these steps first:
   a. Access the Unified Manager
   b. Choose **System**.
   c. Select the **Logoff** menu and then click **Shutdown**.
   d. Click on the **Yes** button.
   e. Wait until the Status changes to **Complete! It is safe to turn off the system**.
   f. Click on the **Done** button.
   g. Exit the Unified Manager.
2. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
3. Ensure the cables connected to the front of the Business Communications Manager and the expansion unit are clearly marked as to how they are connected.
4. Remove the cables from all the media bay modules and the MSC on the Business Communications Manager base function tray and the expansion unit (if attached).
5. Disconnect the Business Communications Manager and expansion unit power cords from the ac outlet.
6. This procedure is complete.

## Install a media bay module in the Business Communications Manager platform base chassis

Use this procedure to install a media bay module in the Business Communications Manager platform base chassis. Only install the media bay modules when the system is powered down.

1. Ensure that the switches on the media bay module are set correctly. For information about how to set the switches, refer to "Set Media Bay Module Dip Switches" on page 130.
   In the case of FEM modules, the switches activate the front ports. Ensure that the switches accurately reflect the ports you require. Refer to "FEM switch settings" on page 149.
2. Select an open media bay.
3. With the face of the media bay module facing toward you, insert the media bay module into the open bay.
4. Push the media bay module completely into the unit. You will hear a click when the module is firmly seated in the media bay.
5. Repeat steps 2 to 4 for each media bay module you want to install.
6. This procedure is complete.

## Install a media bay module in the expansion unit

Use this procedure to install a media bay module in the Business Communications Manager expansion unit chassis. Install the media bay modules when the system is powered down.

1. Ensure that the switches on the media bay module are set correctly. For information about how to set the switches, refer to "Set Media Bay Module Dip Switches" on page 130.

   In the case of FEM modules, the switches activate the front ports. Ensure that the switches accurately reflect the ports you require. Refer to "FEM switch settings" on page 149.
2. Select an open media bay.
3. With the face of the media bay module facing toward you, insert the media bay module into the open bay. Ensure that any cables at the rear of the module are clear of the platform base chassis.
4. Push the media bay module into the unit. You will hear a click when the module is firmly seated in the media bay.
5. Repeat steps 2 to 4 for each media bay module you want to install.
6. Install the front bezel on the expansion unit
7. This procedure is complete.

## Reconnect the equipment

After you install the module correctly into the bay, you must return the equipment to operation in an orderly manner.

Follow these steps carefully to ensure that you return your system to operation without endangering the equipment or yourself.

1. Plug the power cords for the Business Communications Manager and the expansion unit, if there is one, back into the ac outlets.

**Note:** The Business Communications Manager system starts up when you connect the ac power cord. System startup takes several minutes to complete.

2. Connect the cables to the proper outlets on the media bay modules and the MSC on the server.

**Caution:** DECT modules

Plug the base station RJ45 cables into the DECT module one at a time. Ensure each base station begins the startup sequence before plugging in the next module.

3. Check that the LEDs on the modules are on and indicating the correct state. Refer to "Check system power and status" on page 179 for a detailed description of the LED states.
4. Test existing functions to confirm their operation.

5 Configure the module. Refer to the *Business Communications Manager Programming Operations Guide* for details.

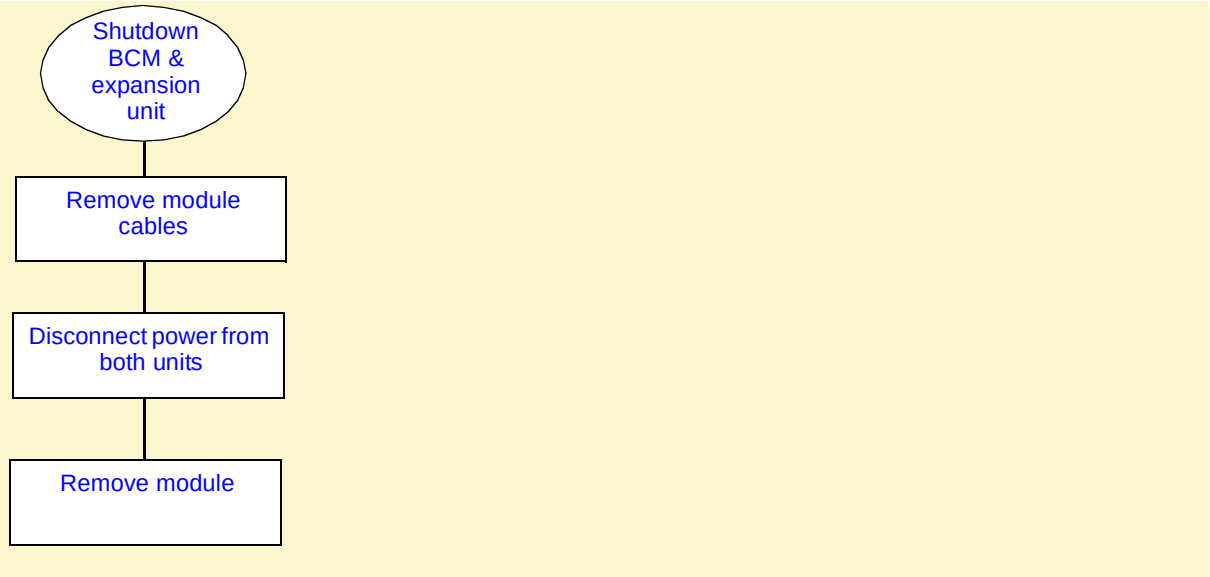
6 This procedure is complete.

# Remove a Media Bay Module

Use the procedures is this section to remove one or more media bay modules from a Business Communications Manager platform base chassis or expansion unit.

Figure 73 provides an overview of the process for removing media bay modules

**Figure 73** Overview of removing a media bay module




## Remove a media bay module from the Business Communications Manager platform base chassis

Use this procedure to remove a media bay module from the Business Communications Manager platform base chassis. Remove the media bay modules after the system is powered down.

1 Power down the Business Communications Manager system (see Shut down the system on page 151).

2 Remove any cabling from the media bay module faceplate.

3 Grasp the right edge of the MBM ejector lever with your thumb, index and middle fingers. Pull outward to partially eject the media bay module bay. Pull further on the lever to eject the media bay module from the bay. Refer to Figure 74 or Figure 75.

4 Grasp the top and bottom edges of the media bay module. Remove the media bay module from the Business Communications Manager platform base chassis MBM bay (see Figure 74, Figure 75). Place the media bay module in a clean, safe and static free area.

**Figure 74** Remove a BCM200 media bay module

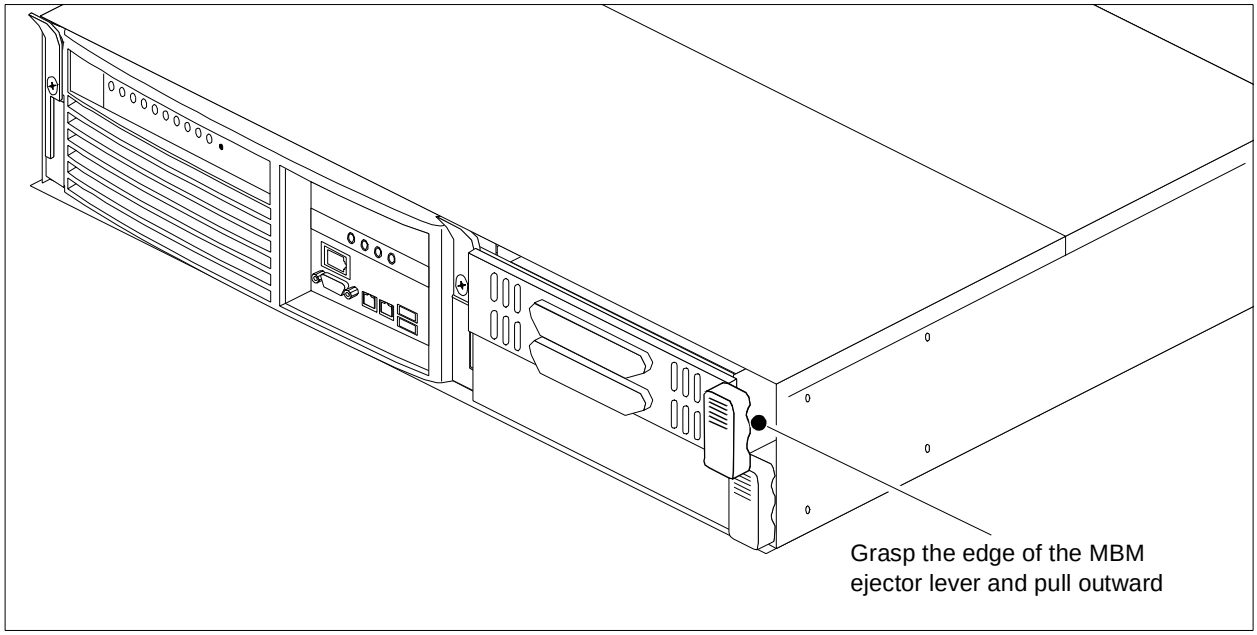
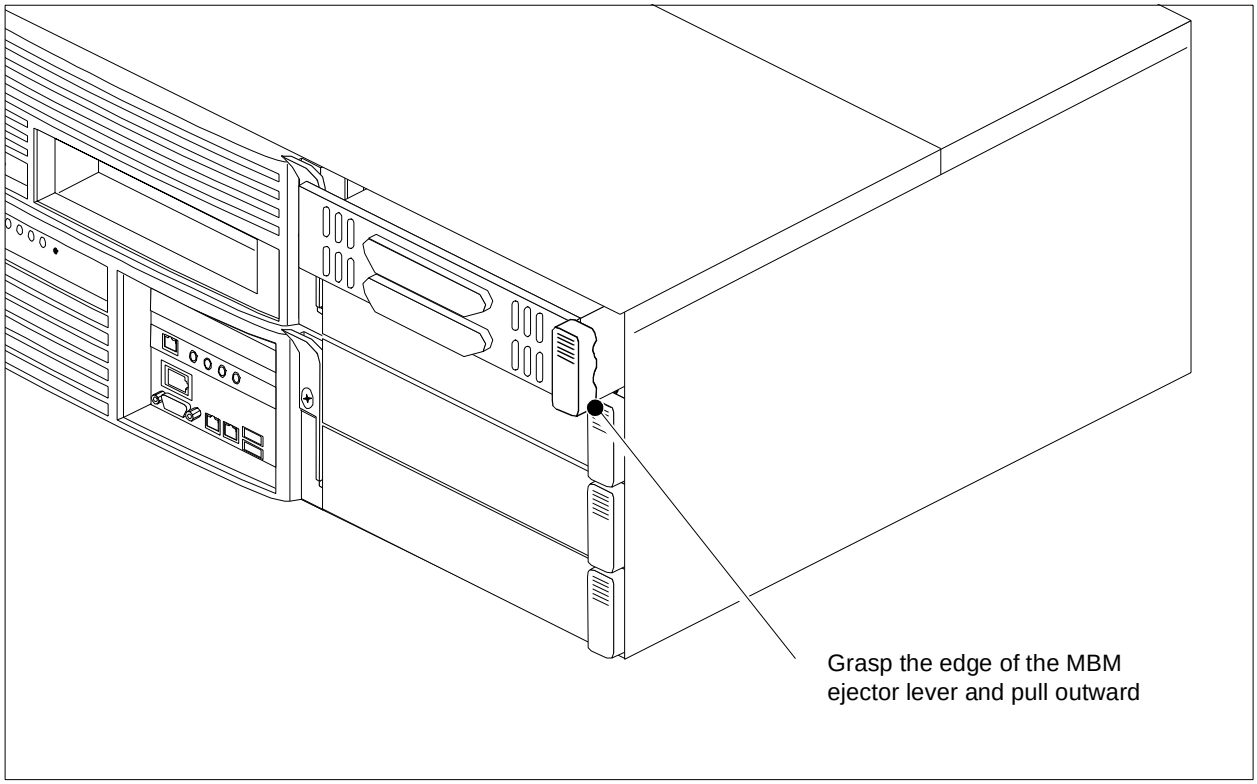



**Figure 75** Remove a BCM400 media bay module



5 This procedure is complete.

## Remove a media bay module from the expansion unit

Use this procedure to remove a media bay module from the Business Communications Manager expansion unit. Remove the media bay modules after the system is powered down.

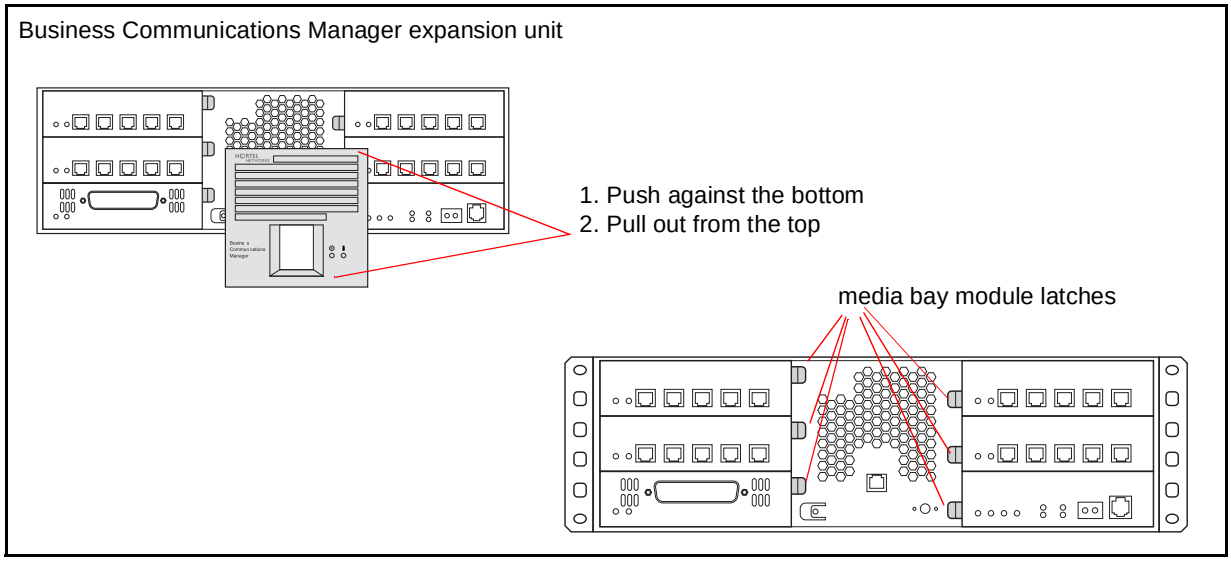
1 Remove any cabling from the media bay module faceplate.

2 Power down the Business Communications Manager expansion unit system (see Shut down the system on page 151).

3 Remove the expansion unit front bezel.

4 Grasp the right edge of the MBM ejector lever. Pull outward to eject the media bay module. Refer to Figure 76.

**Figure 76** Remove the expansion unit front bezel


Business Communications Manager expansion unit
1. Push against the bottom
2. Pull out from the top
media bay module latches

5 Grasp the top and bottom edges of the media bay module. Remove the media bay module from the Business Communications Manager expansion unit. Place the media bay module in a clean, safe and static free area.

6 This procedure is complete.

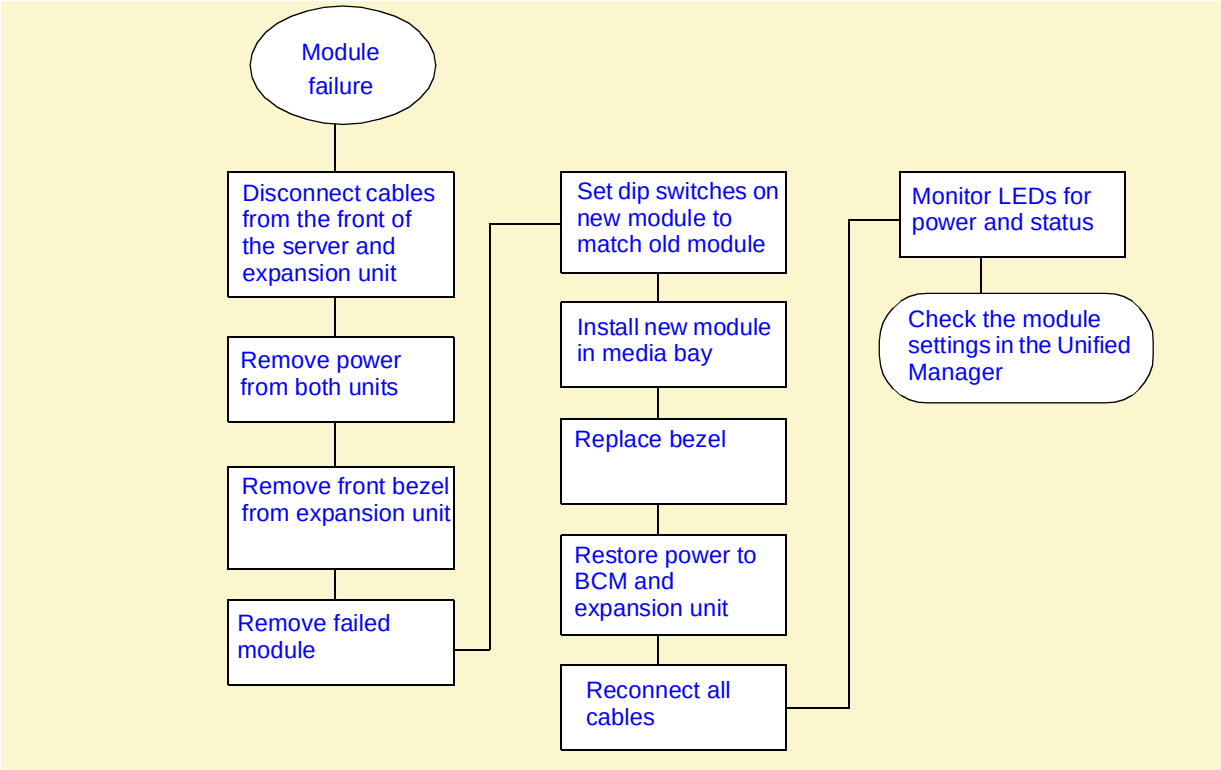
# Replace a Media Bay Module

When media bay modules require replacement, follow the steps in this section.

**Warning:** This section describes replacing a module with the same type of module. If you want to replace a module with a different type of module, you must treat it as a new installation. Refer to Appendix , “Install, Remove, or Replace the Media Bay Modules,” on page 117 and review Figure 65 on page 124 to ensure the new module does not overrun any lines already assigned to other modules.

Figure 77 provides an overview of the process for replacing media bay modules.

**Figure 77** Overview of module replacement process


Module failure
Disconnect cables from the front of the server and expansion unit
Remove power from both units
Remove front bezel from expansion unit
Remove failed module
Set dip switches on new module to match old module
Install new module in media bay
Replace bezel
Restore power to BCM and expansion unit
Reconnect all cables
Monitor LEDs for power and status
Check the module settings in the Unified Manager

If a media bay module fails, follow this procedure to properly replace the module.

1. Follow the steps in “Shut down the system” on page 151 to ensure the system shuts down correctly.
2. Remove all cables and disconnect the Business Communications Manager from the AC power outlet.
3. Remove the front bezel from the unit where the module resides.
4. Pull the latch beside the module to be replaced to release the module. Refer to Figure 74 on page 155.

5 Slide the module out of the bay where it is installed.

6 Record the switch settings from the old module.

7 Set the dip switches on the new module to match the settings you recorded in the previous step.

8 Refer to "Install a Media Bay Module" on page 150 to install the module into the media bay.

9 Refer to "Reconnect the equipment" on page 153 to restore the system to operation.

10 This procedure is complete.

## Wire the Media Bay Modules

This section describes how to wire the cables that connect to the station and trunk modules.

- The station modules have one (ASM, DSM16, 4X16) or two (DSM32) 50-pin amphenol connectors that require 25-pair cables to connect the modules to the equipment in the telephone room where your telco demarcation point is located. Use a qualified technical professional to ensure the cable wiring and your interior telephone wiring are correct.
- Trunk modules (CTM4, CTM8, 4X16, DTM, BRI, and DECT base stations) connect to central office trunks using RJ-type jacks. However, the GATM4 and GATM8 have a 50-pin amphenol connector that requires a 25-pair cable to connect to the CO trunk. These cables can be supplied by qualified technical personnel to ensure the correct pin-out.

**Warning:** Use only qualified persons to service the system.

The installation and service of this unit must be performed by service personnel with the appropriate training and experience. Service personnel must be aware of the hazards of working with telephony equipment and wiring. They must have experience in techniques that minimize any danger of shock or equipment damage.

**Warning: Leakage currents**

Service personnel must be alert to the possibility of high leakage currents becoming available on metal system surfaces during power line fault events on network lines. These leakage currents normally safely flow to Protective Earth ground via the power cord. However, if the ac power is unplugged prior to disconnecting the cables from the front of the base function tray, this hazard can occur.

System shutdown: You must disconnect the media bay module cables from the system before disconnecting the power cord from a grounded outlet.

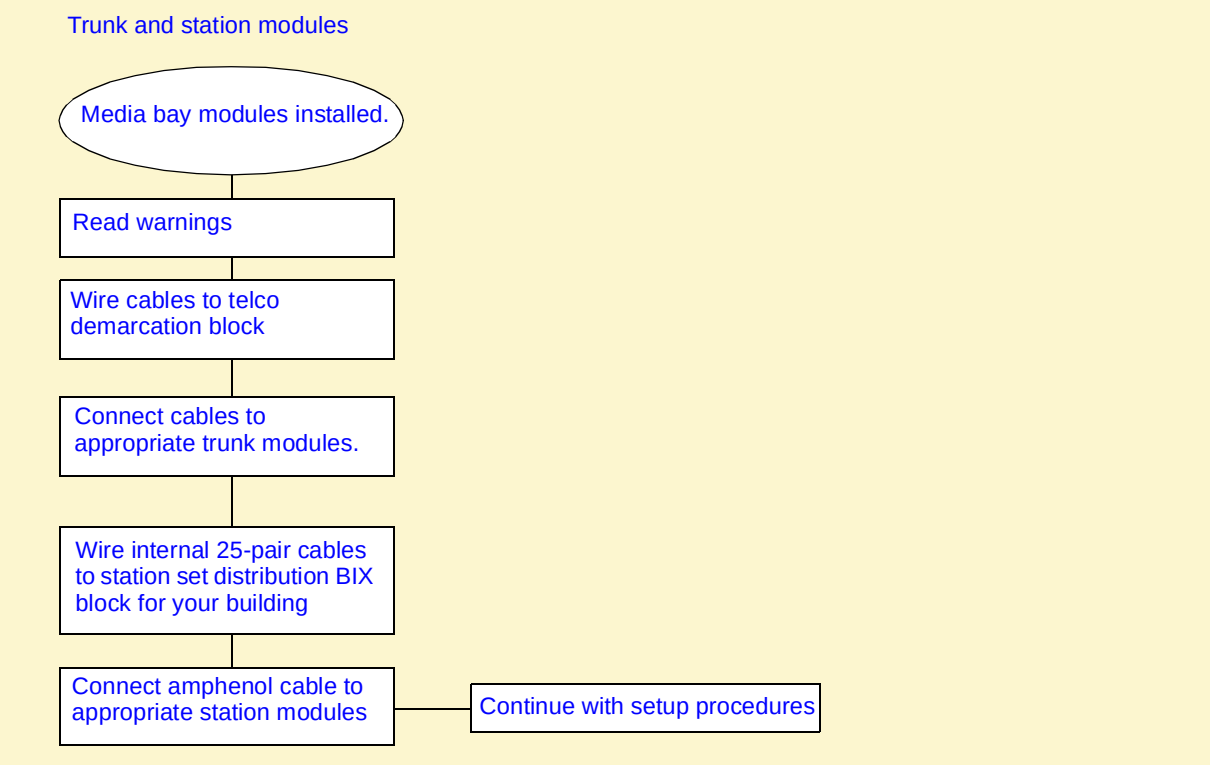
System startup: You must reconnect the power cords to an grounded outlet before reconnecting the cables to the media bay modules.

**Danger: Electrical shock hazards**

Electrical shock hazards from the telecommunications network and ac mains are possible with this equipment. To minimize risk to service personnel and users, the Business Communications Manager system must be connected to an outlet with a third wire ground. In addition, all unused slots must have blank faceplates installed. The covers on all units must be in place at the completion of any servicing.

Figure 78 on page 159 provides an overview of the process for connecting trunk and station wiring to the Business Communications Manager media bay modules.

**Figure 78** Trunk and station wiring overview


Trunk and station modules
Media bay modules installed.
Read warnings
Wire cables to telco demarcation block
Connect cables to appropriate trunk modules.
Wire internal 25-pair cables to station set distribution BIX block for your building
Connect amphenol cable to appropriate station modules
Continue with setup procedures

## Module Wiring Warnings

**Warning: Electrical shock warning**.

The Business Communications Manager media bay modules have been Safety approved for installation into Business Communications Manager base units and expansion units. It is the responsibility of the installer and user to ensure that installation of the Business Communications Manager hardware does not compromise existing Safety approvals.

BEFORE YOU OPEN the Business Communications Manager or Business Communications Manager expansion unit ensure that the network telecom cables are unplugged and the unit is then disconnected from the ac power source.
Station modules: The ports on these modules are meant to be connected only to approved digital telephones and peripherals with the proper cables on a protected internal wiring system.

**Do not connect any telephones to wiring that runs outside of the building.**

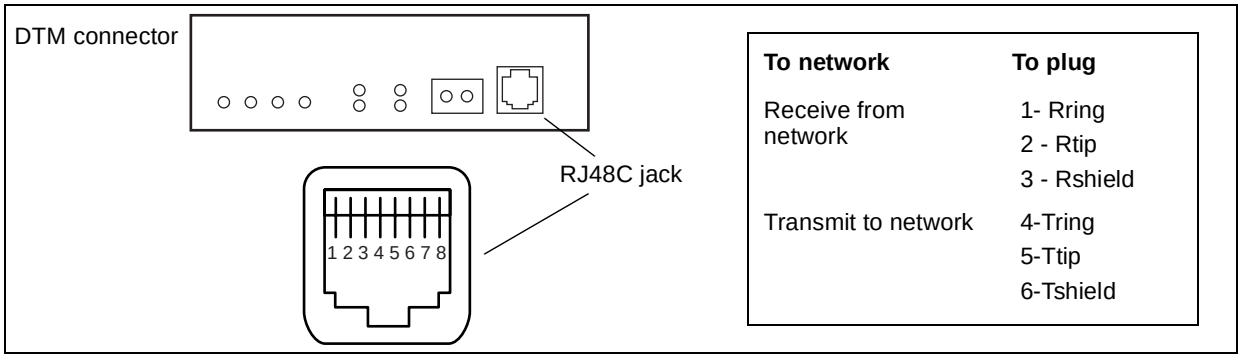
Read and follow the installation instructions carefully.

## Connect the media bay modules to service providers

To connect DTM, CTM, CTM8, BRIM S/T or 4X16 media bay modules to the network, follow these steps:

1. On the front of the module, locate the RJ48C jack (DTM), RJ45 jack (BRI), or the RJ11 jacks (CTM and 4X16 modules).
2. Wire one end of the cable to the telco demarcation blocks of the building.
   - Figure 79 shows the wiring pin outs for a DTM to connect to a service provider.

**Figure 79** DTM RJ48C wiring array

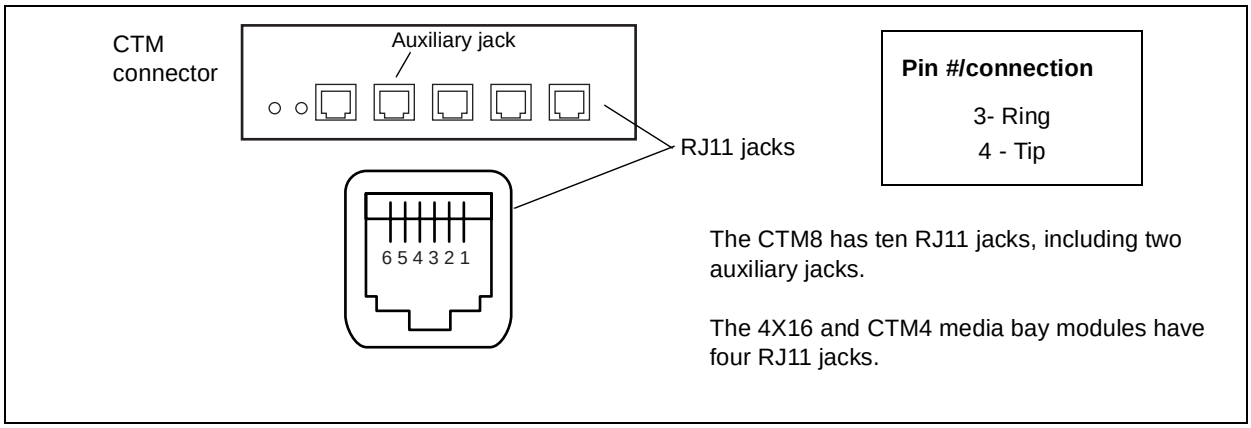


**Warning:** If you are using a service provider channel service unit (CSU), you must disable the Business Communications Manager system internal CSU using Business Communications Manager Unified Manager. For more information, refer to the *Business Communications Manager 2.5, Programming Operations Guide*.

- Figure 80 shows the wiring pin-out for a CTM4, a CTM8, or the CTM jacks on a 4X16 module, to connect to the service provider.

  All the modules have an auxiliary jack (the CTM8 has two). Do not attempt to plug digital equipment into this jack.

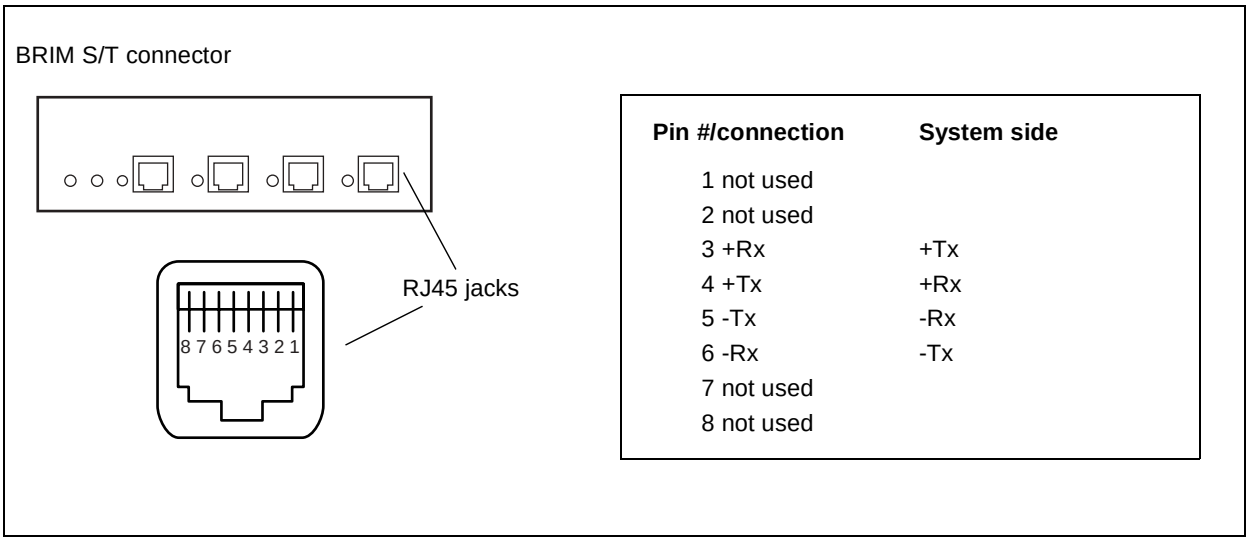
**Figure 80** CTM RJ11 wiring array


CTM connector
Auxiliary jack
RJ11 jacks
6 5 4 3 2 1
Pin #/connection
3- Ring
4 - Tip
The CTM8 has ten RJ11 jacks, including two auxiliary jacks.
The 4X16 and CTM4 media bay modules have four RJ11 jacks.

- Figure 81 shows the wiring pin-out for an BRIM S/T to the service provider. This diagram also applies to an S-Loop BRI and is capable of having S-Loop devices connected to it (video phones, terminal adapters, Grp 3 Fax machines). The T setting on the BRI Loop is used when connected to the CO / PSTN.

**Warning:** The BRIM S/T must only be connected to an NT1 provided by the service provider. The NT1 must provide a Telecommunication Network Voltage (TNV) to Safety Extra Low Voltage (SELV) barrier.

**Figure 81** BRIM S/T RJ45 wiring array




**3** Insert the connector into the jack on the module.

Refer to the *Business Communications Manager 3.0 Programming Operations Guide* for steps about changing the default settings for each line/loop.

**4** You can now use the Unified Manager to configure the lines or sets associated with the module. Refer to the Business Communications Manager 3.0 Programming Operations Guide.

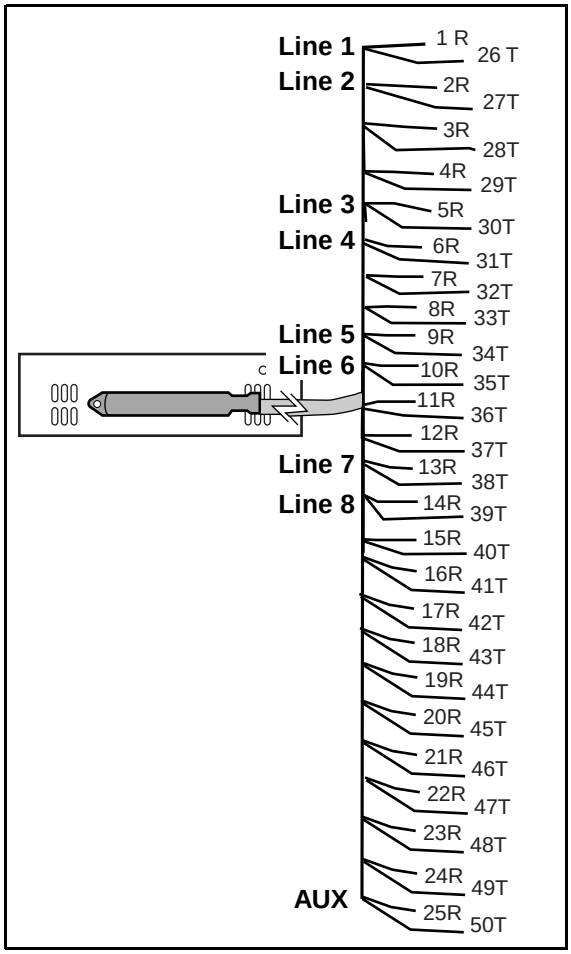
To connect the Global analog trunk module (GATM) to the network, follow these steps:

**1** On the front of the module, locate the amphenol connector.

**2** Wire one end of the cable to the telco demarcation blocks of the building.

- Figure 79 shows the wiring pin outs for a GATM to connect to a service provider.

**Figure 82** GATM pinouts




| Line | Pin | Wire color | GATM module |
|---|---|---|---|
| 1 | 26 | White-Blue | Both |
| | 1 | Blue-White | |
| 2 | 27 | White-Orange | Both |
| | 2 | Orange-White | |
| No connection | 28/3<br>29/4 | | |
| 3 | 30 | White-Slate | Both |
| | 5 | Slate-White | |
| 4 | 31 | Red-Blue | Both |
| | 6 | Blue-Red | |
| No connection | 32/7<br>33/8 | | |
| 5 | 34 | Red-Brown | GATM8 |
| | 9 | Brown-Red | |
| 6 | 35 | Red-Slate | GATM8 |
| | 10 | Slate-Red | |
| No connection | 36/11<br>37/12 | | |
| 7 | 38 | Black-Green | GATM8 |
| | 13 | Green-Black | |
| 8 | 39 | Black-Brown | GATM8 |
| | 14 | Brown-Black | |
| No connection | 40/15 to 49/24 | | |
| Aux | 50 | Violet-Slate | Both |
| | 25 | Slate-Violet | |

## Wire Media Bay Modules to Internal Connections

After you have the trunk modules wired, you can install the wiring to the station modules. These are the modules which connect to the internal telephone sets.

All station module wiring uses 25-pair cable with a female amphenol connector at the module end.

**Note:** DSM 32 modules require two 25-pair cables.

Follow these steps to connect the wiring for the DSM 16, DSM 32, ASM 8, ASM 8+, or 4x16 modules:

**1** Wire 16 wire pairs from the amphenol connector to the local connecting blocks (BIX) so they connect to the 16 station sets you want connected to this module.

Use Table 34 and Figure 83 on page 165.

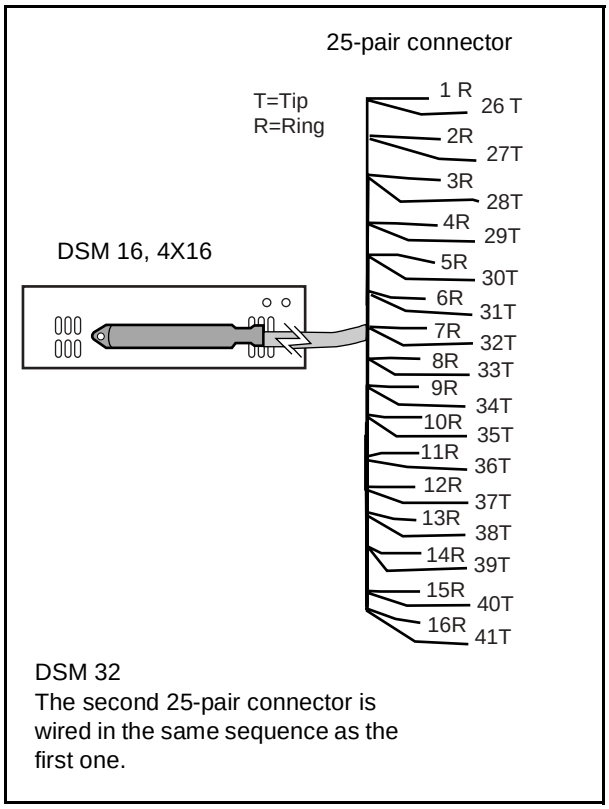
**Note:** Use 16 wire pairs from each connector for the DSM 32.

**Note:** If you are connecting an DSM 16, 4x16, or DSM 32, use Table 34 on page 165. If you are connecting an ASM 8 or ASM 8+, use the Table 35 on page 166.

For an overview of BIX wiring conventions, refer to the *Business Communications Manager BIX Block Wiring Guide*.

Table 34 and Figure 83 provide the wiring scheme for the DSM 16, 4x16 and DSM 32 modules. The Sets heading indicates the set numbering for each of the amphenol pairs. Set DNs are allocated by the Business Communications Manager based on the DS30 channel setting on the station module.

**Figure 83** Wiring for DSM 16/16+, 4X16, DSM 32/32+




[1] Single connector, or bottom connector on DSM 32/32+ modules.

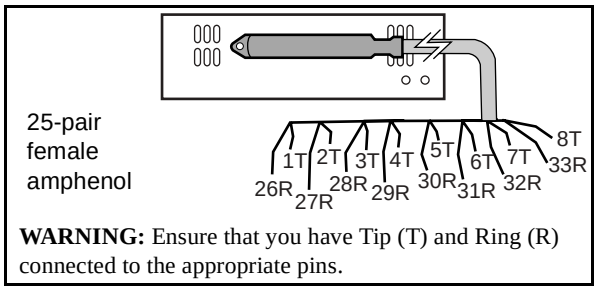
[2] Upper connector on DSM 32/32+ modules.

**Table 34** DSM wiring chart

| Pin | Wire color | Port | [1]Set # | [2]Set # |
|---|---|---|---|---|
| 26 | White-Blue | X01 | 1 | 17 |
| 1 | Blue-White | X01 | 1 | 17 |
| 27 | White-Orange | X02 | 2 | 18 |
| 2 | Orange-White | X02 | 2 | 18 |
| 28 | White-Green | X03 | 3 | 19 |
| 3 | Green-White | X03 | 3 | 19 |
| 29 | White-Brown | X04 | 4 | 20 |
| 4 | Brown-White | X04 | 4 | 20 |
| 30 | White-Slate | X05 | 5 | 21 |
| 5 | Slate-White | X05 | 5 | 21 |
| 31 | Red-Blue | X06 | 6 | 22 |
| 6 | Blue-Red | X06 | 6 | 22 |
| 32 | Red-Orange | X07 | 7 | 23 |
| 7 | Orange-Red | X07 | 7 | 23 |
| 33 | Red-Green | X08 | 8 | 24 |
| 8 | Green-Red | X08 | 8 | 24 |
| 34 | Red-Brown | X09 | 9 | 25 |
| 9 | Brown-Red | X09 | 9 | 25 |
| 35 | Red-Slate | X10 | 10 | 26 |
| 10 | Slate-Red | X10 | 10 | 26 |
| 36 | Black-Blue | X11 | 11 | 27 |
| 11 | Blue-Black | X11 | 11 | 27 |
| 37 | Black-Orange | X12 | 12 | 28 |
| 12 | Orange-Black | X12 | 12 | 28 |
| 38 | Black-Green | X13 | 13 | 29 |
| 13 | Green-Black | X13 | 13 | 29 |
| 39 | Black-Brown | X14 | 14 | 30 |
| 14 | Brown-Black | X14 | 14 | 30 |
| 40 | Black-Slate | X15 | 15 | 31 |
| 15 | Slate-Black | X15 | 15 | 31 |
| 41 | Yellow-Blue | X16 | 16 | 32 |
| 16 | Blue-Yellow | X16 | 16 | 32 |
| 42-40<br>17-25 | no connections | | | |

Table 35 and Figure 84 provide the wiring scheme for the eight pairs that connect to the ASM.

**Figure 84** Wiring for an ASM 8 or ASM 8+




**WARNING:** Ensure that you have Tip (T) and Ring (R) connected to the appropriate pins.

**Table 35** ASM wiring chart

| Pin | Wire color | Port | Set # |
|---|---|---|---|
| 26 | White-Blue | X01 | 1 |
| 1 | Blue-White | X01 | 1 |
| 27 | White-Orange | X02 | 2 |
| 2 | Orange-White | X02 | 2 |
| 28 | White-Green | X03 | 3 |
| 3 | Green-White | X03 | 3 |
| 29 | White-Brown | X04 | 4 |
| 4 | Brown-White | X04 | 4 |
| 30 | White-Slate | X05 | 5 |
| 5 | Slate-White | X05 | 5 |
| 31 | Red-Blue | X06 | 6 |
| 6 | Blue-Red | X06 | 6 |
| 32 | Red-Orange | X07 | 7 |
| 7 | Orange-Red | X07 | 7 |
| 33 | Red-Green | X08 | 8 |
| 8 | Green-Red | X08 | 8 |
| 34-50 | no connection | | |
| 9-25 | | | |

**Note:** Refer to "Assign Line and Extension Numbers for Specific Modules" on page 136 to see the relationship between the DS30 channel number and the DNs. Configuration information is included in the chapters on setting up modules and DNs in the *Business Communications Manager 3.0 Programming Operations Guide*.

2 Install the telephones and peripheral equipment (if a new system):

   **a** Attach the cables for the telephones to the connecting blocks (BIX).

   **b** Install the telephones. Refer to Chapter 14, "Install Optional Telephony Equipment," on page 365.

3 Plug the female amphenol connector into the interface on the front of the module.

4 Set up any mobile system you are using.

- Ensure the base stations are correctly installed and connected to the appropriate modules on the Business Communications Manager. In the case of the NetVision wireless system, ensure that the access point is correctly set up to connect to the Business Communications Manager LAN or WAN.
- Configure and register the handsets according to the instructions provided for each type of system.
  — Companion: *Programming Operations Guide*

— DECT: *DECT Installation and Maintenance Guide*
— T7406: *T7406 Cordless Handset Installation Guide*
— NetVision and NetVision data: *IP Telephony Configuration Guide*

**5** This procedure is complete.

## FEM Wiring

A Fiber Expansion module (FEM) allows you to upgrade from a Norstar system to a Business Communications Manager system by reusing the Norstar expansion modules. The expansion modules connect to the FEM module using the same fiber cable that connected them to the Norstar fiber expansion card.

**Warning:** Handling optical fiber cables:

If the cable is too long, ensure that it is coiled correctly using the fiber spool.
Coil excess fiber cable carefully around the spool provided. Do not bend the cable around any tight corners. Bends in the fiber cable must not be less than 100 mm in diameter. Place the fiber cable spool into a slot at the back of the cable trough in the Norstar module.

**Note:** If you enable all six jacks of the FEM module, the FEM module is the only module you can install on your Business Communications Manager system, because each port requires one DS30 channel. Refer to "FEM switch settings" on page 149.

### Connect the fiber cables

Follow these steps to connect your Norstar expansion modules to a FEM module installed into a Business Communications Manager.

**1** Ensure the Business Communications Manager is powered-up and functional.

**2** Connect the fiber cables from the Norstar expansion modules to the jacks on the FEM module.

**Note:** The dip switch settings you chose determines which FEM ports are available. There are only six ports available. Refer to "FEM switch settings" on page 149.

**a** Connect the Norstar Line Modules to the FEM beginning at fiber port 1.

**b** Connect Norstar Extension Modules to the FEM beginning at fiber port 6.

3 Change the DN records in the Unified Manager or change the set wiring, as required, to match your system.

**Warning:** When you connect a Norstar station module to an FEM, the extension numbers of the telephones connected to the station module may change. To keep the same extension numbers, you will have to change the DNs of the telephones or change the telephone wiring to correspond with the required DNs.

**Note:** If you connect a Norstar station module amphenol cable directly to a DSM, you do not have to modify the wiring connections. Ensure you select the correct DS30 number.

Table 36 compares the designated extension numbers on the Norstar and on the Business Communications Manager.

**Table 36** Extension comparison chart

| Ports | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DS30 channel 2, FEM port 1** | | | | | | | | | | | | | | | | |
| Norstar | 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 |
| BCM | 225 | 226 | 227 | 228 | 221 | 222 | 223 | 224 | 233 | 234 | 235 | 236 | 229 | 230 | 231 | 232 |
| **DS30 channel 3, FEM port 2** | | | | | | | | | | | | | | | | |
| Norstar | 237 | 238 | 239 | 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 |
| BCM | 241 | 242 | 243 | 244 | 237 | 238 | 239 | 240 | 249 | 250 | 251 | 252 | 245 | 246 | 247 | 248 |
| **DS30 channel 4, FEM port 3** | | | | | | | | | | | | | | | | |
| Norstar | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 |
| BCM | 257 | 258 | 259 | 260 | 253 | 254 | 255 | 256 | 265 | 266 | 267 | 268 | 261 | 262 | 263 | 264 |
| **DS30 channel 5, FEM port 4** | | | | | | | | | | | | | | | | |
| Norstar | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 | 281 | 282 | 283 | 284 |
| BCM | 273 | 274 | 275 | 276 | 269 | 270 | 271 | 272 | 281 | 282 | 283 | 284 | 277 | 278 | 279 | 280 |
| **DS30 channel 6, FEM port 5** | | | | | | | | | | | | | | | | |
| Norstar | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 |
| BCM | 289 | 290 | 291 | 292 | 285 | 286 | 287 | 288 | 297 | 298 | 299 | 300 | 293 | 294 | 295 | 296 |
| **DS30 channel 7, FEM port 6** | | | | | | | | | | | | | | | | |
| Norstar | 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 |
| BCM | 305 | 306 | 307 | 308 | 301 | 302 | 303 | 304 | 313 | 314 | 315 | 316 | 309 | 310 | 311 | 312 |

# Set DNs and Port Numbers

The media bay module, based on the switch settings of the module, defines which DNs and port numbers can be populated with telephones. If you have changed the default start DN for your system, use Table 37 to identify the DNs and ports for your sets. If you are using the default start DN (221), a completed chart is provided in Table 51 on page 319.

**Table 37** Cross referencing ports and DNs

| Pin | Wire color | DS30 channel 2 | DS30 channel 3 | DS30 channel 4 | DS30 channel 5 | DS30 channel 6 | DS30 channel 7 |
|---|---|---|---|---|---|---|---|
| 26 | White-Blue | DN Port 201 | DN Port 301 | DN Port 401 | DN Port 501 | DN Port 601 | DN Port 701 |
| 1 | Blue-White | | | | | | |
| 27 | White-Orange | DN Port 202 | DN Port 302 | DN Port 402 | DN Port 502 | DN Port 602 | DN Port 702 |
| 2 | Orange-White | | | | | | |
| 28 | White-Green | DN Port 203 | DN Port 303 | DN Port 403 | DN Port 503 | DN Port 603 | DN Port 703 |
| 3 | Green-White | | | | | | |
| 29 | White-Brown | DN Port 204 | DN Port 304 | DN Port 404 | DN Port 504 | DN Port 604 | DN Port 704 |
| 4 | Brown-White | | | | | | |
| 30 | White-Slate | DN Port 205 | DN Port 305 | DN Port 405 | DN Port 505 | DN Port 605 | DN Port 705 |
| 5 | Slate-White | | | | | | |
| 31 | Red-Blue | DN Port 206 | DN Port 306 | DN Port 406 | DN Port 506 | DN Port 606 | DN Port 706 |
| 6 | Blue-Red | | | | | | |
| 32 | Red-Orange | DN Port 207 | DN Port 307 | DN Port 407 | DN Port 507 | DN Port 607 | DN Port 707 |
| 7 | Orange-Red | | | | | | |
| 33 | Red-Green | DN Port 208 | DN Port 308 | DN Port 408 | DN Port 508 | DN Port 608 | DN Port 708 |
| 8 | Green-Red | | | | | | |
| 34 | Red-Brown | DN Port 209 | DN Port 309 | DN Port 409 | DN Port 509 | DN Port 609 | DN Port 709 |
| 9 | Brown-Red | | | | | | |
| 35 | Red-Slate | DN Port 210 | DN Port 310 | DN Port 410 | DN Port 510 | DN Port 610 | DN Port 710 |
| 10 | Slate-Red | | | | | | |
| 36 | Black-Blue | DN Port 211 | DN Port 311 | DN Port 411 | DN Port 511 | DN Port 611 | DN Port 711 |
| 11 | Blue-Black | | | | | | |
| 37 | Black-Orange | DN Port 212 | DN Port 312 | DN Port 412 | DN Port 512 | DN Port 612 | DN Port 712 |
| 12 | Orange-Black | | | | | | |
| 38 | Black-Green | DN Port 213 | DN Port 313 | DN Port 413 | DN Port 513 | DN Port 613 | DN Port 713 |
| 13 | Green-Black | | | | | | |
| 39 | Black-Brown | DN Port 214 | DN Port 314 | DN Port 414 | DN Port 514 | DN Port 614 | DN Port 714 |
| 14 | Brown-Black | | | | | | |
| 40 | Black-Slate | DN Port 215 | DN Port 315 | DN Port 415 | DN Port 515 | DN Port 615 | DN Port 715 |
| 15 | Slate-Black | | | | | | |
| 41 | Yellow-Blue | DN Port 216 | DN Port 316 | DN Port 416 | DN Port 516 | DN Port 616 | DN Port 716 |
| 16 | Blue-Yellow | | | | | | |

# Media Bay Module Combinations

This section describes some combinations of trunk and station modules to demonstrate how to fit the modules into the DS30 channel resources. These configurations are meant to help demonstrate how your system can be configured using the information in this guide and do not necessarily reflect real-life configurations.

## Combining CTMs/GATMs and 4X16s

The 4X16 combination media bay module is a combination of a CTM4 and a DSM16. A maximum of four CTM4s/GATM4s can fit into a DS30 bus, when each is given a different offset. Therefore, you can combine a maximum of three CTM4s/GATM4s with a 4X16 combination module. This configuration would occupy two full DS30 channels.

You can install a maximum of three of the above combinations in a Business Communications Manager system with an expansion unit added to it. Table 38 demonstrates this configuration of CTMs and 4X16 modules, including the switch settings for each module.

**Table 38** CTMs/GATMs combined with 4X16 modules

| Each heavily-outlined and shaded square represents one module. | | | | Switch setting | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **DS30 channel #** | **2 4x16s Offset 3** | **4 CTM4s/GATM4s Offset 0, 1 and 2** | **1 CTM8/GATM8 Offset 2** | **1** | **2** | **3** | **4** | **5** | **6** |
| **2** | | 0 | CTM/GATM settings: | on | on | on | on | on | on |
| | | 1 | CTM/GATM settings: | on | on | off | on | on | on |
| | | 2 | CTM/GATM settings: | on | off | on | on | on | on |
| | 3 | Switch settings for 4X16: | | on | off | off | on | on | on |
| **3** | | | | | | | | | |
| **4** | | 0 | CTM/GATM settings: | on | on | on | on | off | on |
| | | | 2 | on | on | off | on | off | on |
| | | | | on | off | on | on | off | on |
| | 3 | Switch settings for 4X16: | | on | off | off | on | off | on |
| **5** | | | | | | | | | |

## Fully-loaded Setup

This section describes a system containing one DSM 32/32+, one DSM 16/16+, two ASM 8s, and two DTMs. This configuration uses all the DS30 channels, with the exception of two offsets.

Table 39 demonstrates this combination, including the switch settings for each module.

**Table 39** DSM combined with 2 DTMs and 2 ASMs

| DS30 channel # | Each heavily-outlined and shaded square represents one module. | | | | Switch setting | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 DSM 32/32+ Offset 0 | 1 DSM 16/16+ Offset 0 | 2 ASM 8s Offset 0 and 1 | 2 DTMs Offset 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 2 | 0 | DSM 32 settings: | | | on | on | on | on | on | on |
| 3 | | | | | | | | | | |
| 4 | | 0 | DSM 16 settings: | | on | on | on | on | off | on |
| 5 | | | 0 | ASM 8 settings: | on | on | on | on | off | off |
| | | | 1 | ASM 8 settings: | on | on | off | on | off | off |
| 6 | | | | 0 | on | on | on | off | on | on |
| 7 | | | | 0 | on | on | on | off | on | off |

Table 40 demonstrates either a full double-density system or a partial double-density system because DS30 06 and 07 have trunk modules installed. Double density only affects system modules.

**Table 40** All station modules set for double density

| DS30 channel # | Each heavily-outlined and shaded square represents one module. | | | | Switch setting | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 DSM 32+ Offset 0 | 1 DSM 16+ Offset 0 | 2 ASM 8s Offset 0 and 1 | 2 DTMs Offset 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 2 | 0 | DSM 32+ settings: | | | off | on | on | on | on | on |
| 3 | 0 | DSM 32+ settings: | | | off | on | on | on | on | off |
| 4 | | 0 | DSM 16+ settings: | | off | on | on | on | off | on |
| | | 0 | DSM 16+ settings: | | off | on | off | on | off | on |
| 5 | | | 0 | ASM 8 settings: | on | on | on | on | off | on |
| | | | 1 | ASM 8 settings: | on | on | off | on | off | on |
| | | | 0 | ASM 8 settings: | on | off | on | on | off | on |
| | | | 1 | ASM 8 settings: | on | off | off | on | off | on |
| 6 | | | | 0 | on | on | on | off | on | on |
| 7 | | | | 0 | on | on | on | off | on | off |

Table 41 Demonstrates a partial double density system (PDD - the default setting for 3.0), where Companion can be installed on DS30 06 and 07.

**Table 41** Two double density DSMs, plus a single-density DSM for Companion

| DS30 channel # | Each heavily-outlined and shaded square represents one module. | | Switch setting | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 DSM 32+ Offset 0 | 2 DTMs Offset 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 2 | 0 | DSM 32+ settings: | off | on | on | on | on | on |
| 3 | 0 | DSM 32+ settings: | off | on | on | on | on | off |
| 4 | | 0 | on | on | on | on | off | on |
| 5 | | 0 | on | on | on | on | off | off |
| 6 | 0 | DSM 32+ set to single density for Companion: | on | on | on | off | on | off |
| 7 | | | | | | | | |

## DECT Combinations

This section describes a system containing a DECT module, three BRI modules and two DSM 32s. This configuration uses all the DS30 channels, with the exception of one offset.

**Note:** DECT systems are not available for all profiles. Refer to "Regional mobility services" on page 400.

Table 42 demonstrates this combination, including the switch settings for each module.

**Table 42** Three BRI modules, two DSM 32s and 1 DECT module

| DS30 channel # | Each heavily-outlined and shaded square represents one module. | | | Switch setting | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 DECT Offset 0 | 3 BRI Offset 0, 1 and 2 | 2 DSM 32s Offset 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| 2 | | | 0 | on | on | on | on | on | on | |
| 3 | | | | | | | | | | |
| 4 | | | 0 | on | on | on | on | off | on | |
| 5 | | | | | | | | | | |
| 6 | 0 | DECT switch settings: | | on | on | off | on | on | on | |
| 7 | | 0 | BRI settings | on | on | on | off | on | off | |
| | | 1 | BRI settings | on | on | off | off | on | off | |
| | | 2 | BRI settings | on | off | on | off | on | off | |

# Changing Configurations

Here are some points to consider when changing modules in existing or in new Business Communications Manager systems:

- Trunk and analog station modules cannot share a DS30 channel.
- Modules that require more than one DS30 channel automatically assign the next channel in chronological order.
  Therefore, if an existing, installed module uses either of the required DS30 channels, remove the installed module. You must then assign the dip switches for both modules so there is no conflict between them or with any other installed module.
- The goal is to have a balanced mix of trunk and station modules.
- Write the dip switch settings for each module in a place that is handy to reference when you decide to change or add modules.
- If you update your Norstar system to Business Communications Manager, your station amphenol connectors can be connected into the media bay modules without adjustment. Trunk connectors must be converted to RJ11 (CTM) or RJ45 (BRI) connectors.
  However, if you use the FEM module to connect your Norstar modules to the Business Communications Manager, the station wiring needs to be adjusted. Refer to "FEM Wiring" on page 167.

# System Setup

Use the following table to make a note of your basic system setup. Post this page near the Business Communications Manager hardware for future reference.

| | DS30 channel 2 | DS30 channel 3 | DS30 channel 4 |
|---|---|---|---|
| Media bay module | | | |
| dip switch setting | | | |
| Line/set type | | | |
| Line/Loop/DN range | | | |

| | DS30 channel 5 | DS30 channel 6 | DS30 channel 7 |
|---|---|---|---|
| Media bay module | | | |
| dip switch setting | | | |
| Line/set type | | | |
| Line/Loop/DN range | | | |

# Chapter 5
# Business Communications Manager System Startup

This chapter describes initial system startup procedures for the Business Communications Manager and contains the following primary information:


- "Check Power and Wiring" on page 178
- "Connect the Data Networking Hardware" on page 180
- "Initialize the System" on page 185
- "Enter the software keycodes" on page 191


The Business Communications Manager and expansion unit are each powered through an AC outlet. The voltage required depends on the geographical location of the units.

All systems are initially set at the factory, based on the intended destination. You must check that the voltage and wiring are correct for you system before you connect any of the units to the power source. Incorrect power settings result in equipment damage

Read the following warnings. You must protect yourself and the Business Communications Manager from possible electrical shocks.

**Warning:** Use only qualified persons to service the system

The installation and service of this unit must be performed by service personnel with the appropriate training and experience. Service personnel must be aware of the hazards of working with telephony equipment and wiring. They must have experience in techniques that minimize any danger of shock or equipment damage.

**Danger:** Electrical shock hazards

Electrical shock hazards from the telecommunications network and ac mains are possible with this equipment. To minimize risk to service personnel and users, the Business Communications Manager system must be connected to an outlet with a third wire ground. In addition, all unused slots must have blank faceplates installed. The covers on all units must be in place at the completion of any servicing.

**Warning:** Leakage currents
Service personnel must be alert to the possibility of high leakage currents becoming available on metal system surfaces during power line fault events near network lines. These leakage currents normally safely flow to Protective Earth ground via the power cord.

System shutdown: You must disconnect the media bay module cables from the system before disconnecting the power cord from a grounded outlet.

System startup: You must reconnect the power cords to a grounded outlet before reconnecting the cables to the media bay modules.

## Check Power and Wiring

The Business Communications Manager system is available as North American and International versions. Ensure that the power supply is correct for your location. BCM200/400 systems have standard power supplies and redundant power supplies which adjust automatically to the required voltage.

Follow this procedure to check the voltage and wiring, and power up the system:

1 Check all wiring before connecting power to the Business Communications Manager units.

**Warning:** Connecting power

Always connect power to the Business Communications Manager platform system and expansion units before you reconnect the cabling to the front of the units.

2 Connect the Business Communications Manager power cord to an electrical outlet that is a non-switchable, third wire ground ac outlet.

If you use a power bar, plug the power cords into the power bar and connect the power bar to the ac outlet.

3 Connect the Business Communications Manager expansion unit power cord to an electrical outlet that is a non-switchable, third wire ground ac outlet.

**Danger:** Do not fasten power supply cords.
Do not fasten the Business Communications Manager or Business Communications Manager expansion unit power supply cords to any building surface.

4 This procedure is complete.

## Check system power and status

After you connect power to the Business Communications Manager system, the Power LED on the front of the base function tray and expansion unit lights. Once the system services have reactivated, the Status LED turns solid green. For further information on LED indicators, see Table 61 on page 371.

The Power LED can indicate RED if the system is in standby mode whereby power is available, but shutdown by the operating system (when UPS) or Overtemp.

LEDs in position 3-8 will flash when the SSM is not communicating (during startup, shutdown or operating system hang).

**Note:** During system initialization, the system performs diagnostics on the hardware configuration size and installation. If the power fails, system data remains in memory.

1. If the base function tray Power LED does not light:
   - **a** Disconnect the power cords.
   - **b** Check all cables and power connections. Ensure that the ac outlet has power.
   - **c** Reconnect the power cords.
2. If the Power LED is red and there is no power, use a paper-clip to select the reset button. Alternatively power cycle the system to restart.
3. You are now ready to connect the system to the network and initialize it.

**Note:** You can monitor the state of the Business Communications Manager LEDs from your computer. Refer to "Monitor System Status Through the Unified Manager" on page 373.

When the system power is on, and the system has successfully booted, the power and status LEDs on the faceplates of the media bay modules are lit and remain constant. Figure 85 shows an example of a media bay module and the LEDs on the module faceplate.

**Figure 85** Module power and status LEDs

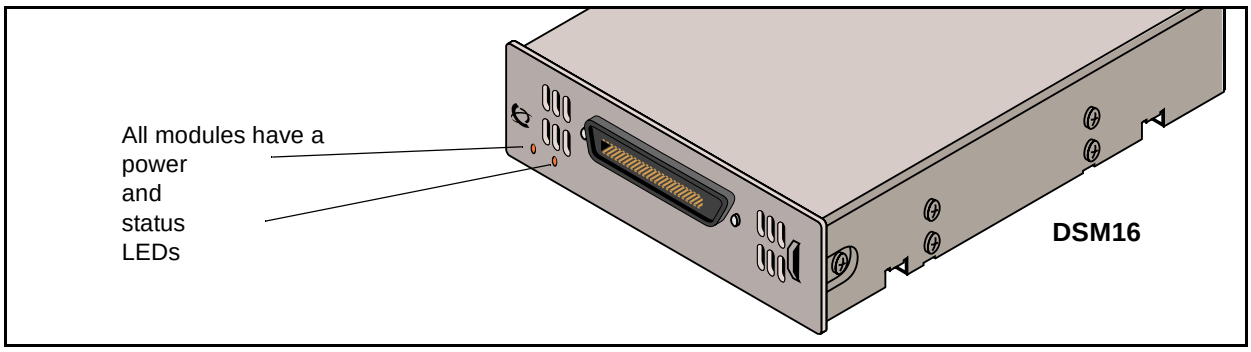


**Table 43** Module power and status LED states

| LED Label | Description | Green LED On | Green LED Flash | Red LED On (Only) | Green LED Off |
|---|---|---|---|---|---|
| | Indicates state of system power. | OK | Check for hardware problem with fan, power or heat inside housing | a minimum of 1 PS needs attention | no power to the module |
| | Indicates condition of system status | all monitored services are functioning | in startup/shutdown mode<br>check for problem with MSC wiring | N/A | not all services are working, MSC may not have started correctly |

# Connect the Data Networking Hardware

This section describes how to connect network cards to the Business Communications Manager system.

**Warning:** Check with your network administrator before you connect the Business Communications Manager to the network to ensure there are no IP address conflicts. The default address for the Business Communications Manager system:

- IP: 10.10.10.1
- Subnet: 255.255.255.0

**Warning:** If the default IP address would create a network conflict, you must change the IP address of the Business Communications Manager before you connect any network connections.

To change the IP address outside of a network, you can use one of the following:

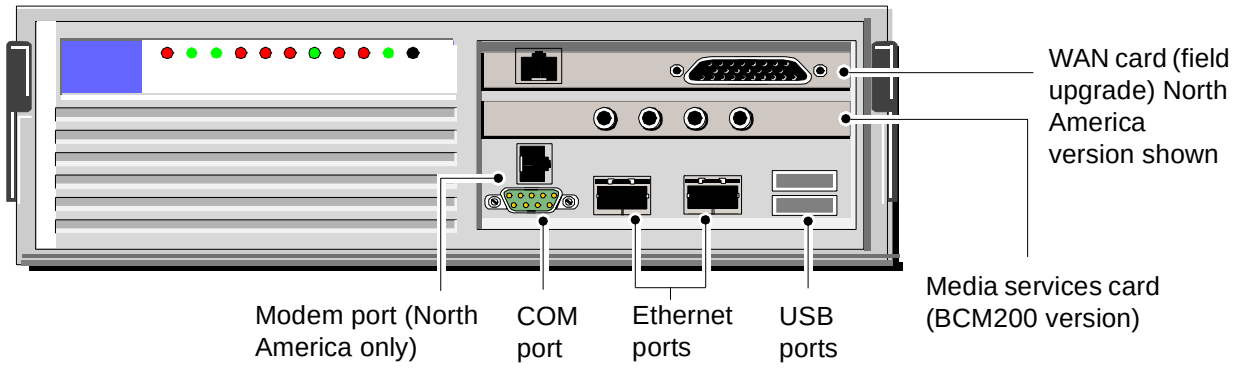
- a terminal and a null modem cable
- a computer and an ethernet crossover cable

Refer to “Use of a null modem serial cable” on page 186 or “Ethernet crossover cable usage” on page 190 for detailed instructions about connecting to the Business Communications Manager.

## Connect the cards

The data networking hardware (MSC) is installed in the Business Communications Manager at the factory. All systems have dual embedded ethernet interfaces. Some models come with an embedded V.90 modem. WAN cards and modems are ordered separately. Figure 86 shows a BCM200 configuration with a field-installed WAN card.

**Figure 86** Base function tray data cards


WAN card (field upgrade) North America version shown
Media services card (BCM200 version)
Modem port (North America only)
COM port
Ethernet ports
USB ports

**Note:** Your system may not have all the cards indicated.

**Warning:** Do not plug the WAN or modem cables into the system unless it is running.

For maintenance shutdowns, ALWAYS follow this process:

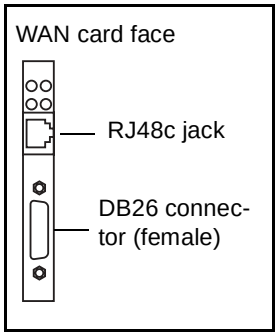
**a** Shut down the software through the Unified Manager, if possible.

**b** Remove all cable connections from the front of the base function tray and expansion unit.

**c** Remove power from the Business Communications Manager and the expansion unit.

**d** DO NOT RECONNECT the cables to the front of the units until the power connection has been restored.

## Connect wiring to the WAN card




Ensure the system is powered up before connecting this cable.

To connect the WAN card using the RJ48C connector, insert the wide area network (WAN) cable into the RJ48C jack on the WAN card.

For information about the location of the WAN card, refer to Figure 86 on page 181.

To connect the WAN card using the DB26 connector, use an adapter cable to connect the wide area network (WAN) cable to the DB26 connector on the WAN card. These adapter cables are available from your Business Communications Manager supplier.

**Note:** Not all systems are equipped with a WAN card.

Table 44 shows the wire connections for a DB25 adapter cable.

**Table 44** DB25 adapter cable

| DB26 on WAN card | Signal | DB25 cable |
|---|---|---|
| 1 | Chassis Ground | 1 |
| 2 | Transmit Data | 2 |
| 3 | Receive Data | 3 |
| 4 | Request to Send | 4 |
| 5 | Clear to Send | 5 |
| 6 | Data Set Ready | 6 |
| 7 | Signal Ground/ Common Return | 7 |
| 8 | Data Carrier Detect | 8 |
| 9 | | 9 |
| 10 | | 10 |
| 11 | | 11 |
| 12 | | 12 |
| 13 | | 13 |
| 14 | | 14 |
| 15 | Transmit Clock | 15 |
| 16 | | 16 |
| 17 | Receive Clock | 17 |
| 18 | | 18 |
| 19 | | 19 |
| 20 | Data Terminal Ready | 20 |
| 21 | | 21 |
| 22 | | 22 |
| 23 | | 23 |
| 24 | External Clock | 24 |
| 25 | | 25 |
| 26 | | |

## Connect wiring to the modem

Ensure the system is powered up before connecting this cable.

To connect the modem, insert a PSTN line into the Line jack on the base function tray modem interface. For information about the location of the modem interface, refer to Figure 86 on page 181.

**Note:** Not all systems are equipped with a modem.

Table 45 shows the wire connections for a RS-422/EIA 530 cable

**Table 45** RS-422/EIA 530 adapter cable

| DB26 on WAN card | Signal | RS-422/EIA 530 cable |
|---|---|---|
| 1 | Protective Ground | 1 |
| 2 | Transmit Data A | 2 |
| 3 | Receive Data A | 3 |
| 4 | Request to Send A | 4 |
| 5 | Clear to Send A | 5 |
| 6 | Data Set Ready A | 6 |
| 7 | Signal Ground | 7 |
| 8 | Data Carrier Detect A | 8 |
| 9 | Receive Clock B | 9 |
| 10 | Data Carrier Detect B | 10 |
| 11 | External Clock B | 11 |
| 12 | Transmit Clock B | 12 |
| 13 | Clear To Send B | 13 |

| DB26 on WAN card | Signal | RS-422/EIA 530 cable |
|---|---|---|
| 14 | Transmit Data B | 14 |
| 15 | Transmit Clock A | 15 |
| 16 | Receive Data B | 16 |
| 17 | Receive Clock A | 17 |
| 18 | | 18 |
| 19 | Request To Send B | 19 |
| 20 | Data Terminal Ready A | 20 |
| 21 | | 21 |
| 22 | Data Set Ready B | 22 |
| 23 | Data Terminal Ready B | 23 |
| 24 | External Clock A | 24 |
| 25 | | 25 |
| 26 | | |

Table 46 shows the wire connections for a V.35 adapter cable.

**Table 46** V.35 Adapter Cable

| DB26 on WAN card | Signal | V.35 cable |
|---|---|---|
| 1 | Protective Ground | A |
| 2 | Transmit Data A | P |
| 3 | Receive Data A | R |
| 4 | Request to Send | C |
| 5 | Clear to Send | D |
| 6 | Data Set Ready | E |
| 7 | Signal Ground | B |
| 8 | Data Carrier Detect | F |
| 9 | Receive Clock B | X |
| 10 | | |
| 11 | External Clock B | W |
| 12 | Transmit Clock B | AA |
| 13 | | |

| DB26 on WAN card | Signal | V.35 cable |
|---|---|---|
| 14 | Transmit Data B | S |
| 15 | Transmit Clock A | Y |
| 16 | Receive Data B | T |
| 17 | Receive Clock A | V |
| 18 | | |
| 19 | | |
| 20 | Data Terminal Ready | H |
| 21 | | |
| 22 | | |
| 23 | | |
| 24 | External Clock A | U |
| 25 | | |
| 26 | | |

Table 47 shows the wire connections for a DB15 X.21 adapter cable.

**Table 47** DB15 X.21 adapter cable

| DB26 on WAN card | Signal | DB15 X.21 cable |
|---|---|---|
| 1 | Chassis Ground | 1 |
| 2 | Transmit Data A | 2 |
| 3 | Receive Data A | 4 |
| 4 | Request to Send A | 3 |
| 5 | Clear to Send A | 5 |
| 6 | | |
| 7 | Signal Ground | 8 |
| 8 | | |
| 9 | Receive Clock B | 13 |
| 10 | | |
| 11 | External Clock B | 14 |
| 12 | | |
| 13 | Clear To Send B | 12 |

| DB26 on WAN card | Signal | DB15 X.21 cable |
|---|---|---|
| 14 | Transmit Data B | 9 |
| 15 | | |
| 16 | Receive Data B | 11 |
| 17 | Receive Clock A | 6 |
| 18 | | |
| 19 | Request To Send B | 10 |
| 20 | | |
| 21 | | |
| 22 | | |
| 23 | | |
| 24 | External Clock A | 7 |
| 25 | | |
| 26 | | |

### Install the cards

Refer to Chapter 10, “Replace Data Cards and Processing Hardware,” on page 283 for the removal and installation process for these cards.

## Initialize the System

After starting the Business Communications Manager system, you are ready to set the initial configuration parameters.

The initial configuration defines your Business Communications Manager to the network. It also gives the system a unique identity and initial parameters. From that point, you can continue with the specific configurations for your system, which are described in *Business Communications Manager 3.0 Programming Operations Guide*, and the other user guides for each optional application you choose to add to your system.

### Data parameter requirements

Obtain the following parameter values from an Internet Service Provider (ISP) or corporate network administrator.

- initial IP address and netmask for each network interface
- primary (and optional secondary) DNS servers
- default next-hop router
- fractional T1 channel numbers (if you are using fractional TI)
- system name
- WAN link protocol
- frame relay DLCI / CIR (if applicable)
- V.90 modem settings (North America only)

### Default IP settings

All Business Communications Manager systems are shipped with this default address:

- IP:  10.10.10.1
- Subnet:  255.255.255.0

**Warning:** Before using this address on your network, check with your system administrator. If this address conflicts with the LAN settings, you can cause network damage if you connect the network without changing the IP address.

If you can use the default IP address, you can connect the Business Communications Manager server to the LAN. This allows you to configure to the Business Communications Manager system from your PC through the Unified Manager.

## Connecting when there is an IP address conflict

If you cannot use the default IP address, you must change the IP address of the Business Communications Manager system through one of these connections:

- a terminal and a null modem cable. Refer to "Use of a null modem serial cable" on page 186.
- a computer and an Ethernet crossover cable. Refer to "Ethernet crossover cable usage" on page 190.

After you set the initial parameters, you can connect to the Unified Manager through the network to complete the system setup using the Quick Start Wizard.

If you do not have a network connection, you can also access a Quick Start Wizard through a serial link.

For detailed information about configuring the Business Communications Manager system, refer to the *Business Communications Manager 2.5, Programming Operations Guide*

### Use of a null modem serial cable

You must use a null modem cable connection to the Business Communications Manager base function tray if the default IP address is not compatible with your LAN or WAN network.

Required equipment:

- null modem cable
- VT100-compatible terminal or a computer that has a terminal program such as Hyperterminal

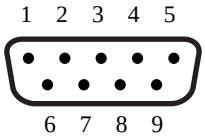
**Warning:** Your terminal must be VT100-compatible and must support the VT100 National Character set. If the terminal does not support the National Character set, the text displays incorrectly.

## Null modem cable setup

Table 48 shows the correct wiring for the Business Communications Manager serial port of the null modem cable.

**Table 48** Serial port pinout

**Figure 87** Serial pinout




| Pin | Signal |
|---|---|
| 1 | Data Carrier Detect (DCD) |
| 2 | * Serial data in (RX) |
| 3 | * Serial data out (TX) |
| 4 | Data Terminal Ready (DTR) |
| 5 | * Ground |

| Pin | Signal |
|---|---|
| 6 | Data Set Ready (DSR) |
| 7 | Request to Send (RTS) |
| 8 | Clear to Send (CTS) |
| 9 | Ring Indicator (RI) |

* required connections

Transmission parameters:

- 9600 bits per second
- 8 data bits
- no parity
- 1 stop bit
- hardware flow control

**Note:** For instructions about how to set the transmission parameters, refer to the terminal or terminal emulation program documentation. The Business Communications Manager system supports carriage return.

## Display the configuration menus

To perform this procedure, the Business Communications Manager must be correctly powered up, as described in "Check system power and status" on page 179.

1 Attach the null modem cable to the serial port on the Business Communications Manager.

**Note:** The location of the transmit (TX) and receive (RX) pins on your terminal can vary. Refer to your terminal or computer documentation to confirm pin locations.

2 Attach the other end of the null modem cable to the serial port on the terminal or computer.

3 Ensure that the Business Communications Manager and your terminal or computer are turned on.

4 Access the Business Communications Manager using one of the following methods:

   a If using a terminal emulation program (Hyperterm), attach a configuration computer to the base function tray serial port (recommended method). Press <ENTER>. Continue to the next step in this procedure when complete.

   b If you are accessing the Business Communications Manager through your local area network through SSH (secure socket shell), use the default IP address 10.10.10.1. Continue to the next step in this procedure when complete.

5 When prompted for a **User ID**, type:

   **`ee_admin`** <ENTER>.

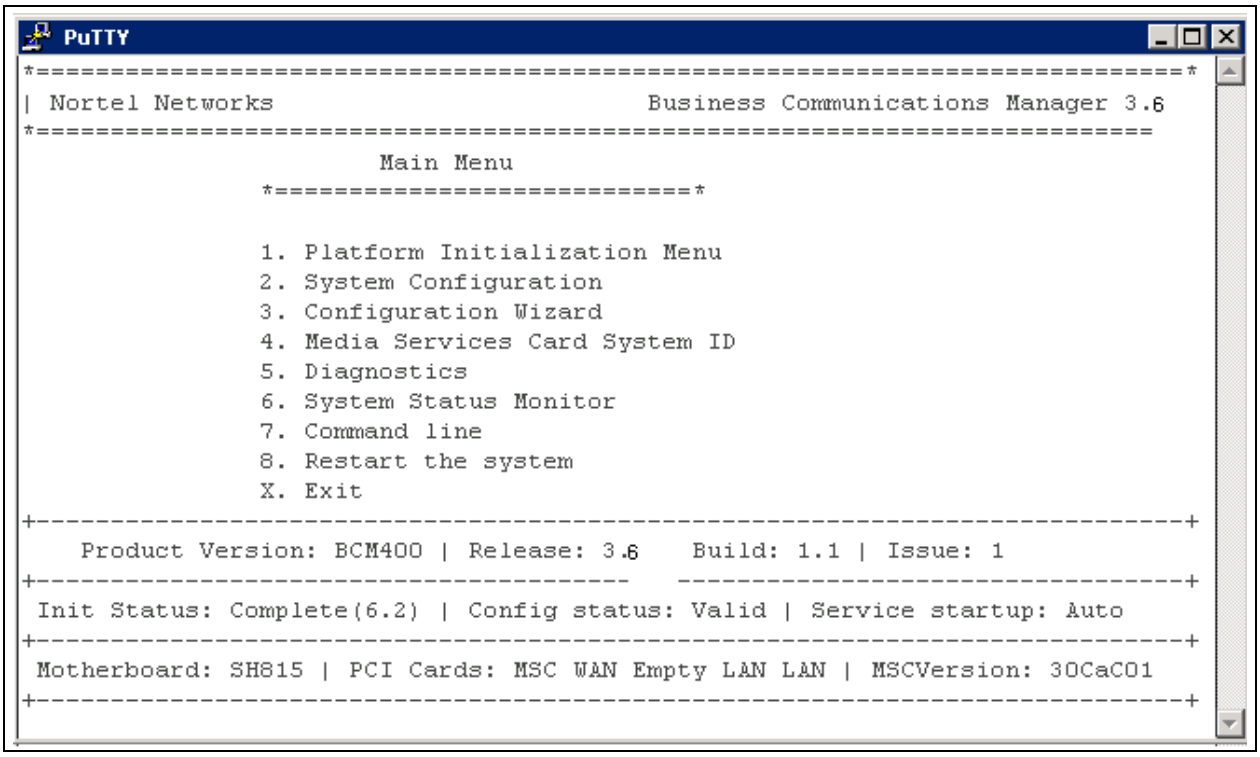
6 When prompted for a **Domain**, press <ENTER>.

7 When prompted for a **Password**, type:

   **`PlsChgMe!`** <ENTER>

8 The Configuration main menu screen appears. Refer to Figure 88 on page 189.

**Figure 88** Configuration main menu screen


PuTTY
| Nortel Networks Business Communications Manager 3.6
Main Menu
1. Platform Initialization Menu
2. System Configuration
3. Configuration Wizard
4. Media Services Card System ID
5. Diagnostics
6. System Status Monitor
7. Command line
8. Restart the system
X. Exit
Product Version: BCM400 | Release: 3.6 Build: 1.1 | Issue: 1
Init Status: Complete(6.2) | Config status: Valid | Service startup: Auto
Motherboard: SH815 | PCI Cards: MSC WAN Empty LAN LAN | MSCVersion: 30CaC01

**Note:** If the Initialization Menu screen appears instead of the Main Menu shown above, your Business Communications Manager system is not initialized correctly.

**9** If you want to change the IP addressing, enter 2 (System Configuration) and follow the prompts.

**10** If you want to configure the system through the serial port, enter 3 (Configuration Wizard). This wizard also allows you to change the IP addressing information.

The Configuration Wizard has the same information as the Quick Start Wizard that you access through the Unified Manager, but in a slightly different format. Refer to the *Programming Operations Guide* for a detailed description of the fields that occur in the Configuration Wizard.

**Note:** When you change IP address, Region, Template and/or Start DN, the system prompts you for a restart after you accept the changes.
After the system restarts, you can continue with your system configuration.

**Warning:** Changing this information on an existing system completely erases the telephony programming and disables the telephony system. It also reboots the Business Communications Manager and expansion unit.

# Ethernet crossover cable usage

You use an ethernet crossover cable connected to a computer with a network card to connect your computer to the LAN card in the Business Communications Manager. With this connection, you can run Business Communications Manager Unified Manager to configure the Business Communications Manager system when you are unable to immediately connect your system to the live LAN card or your system does not have a network connection.

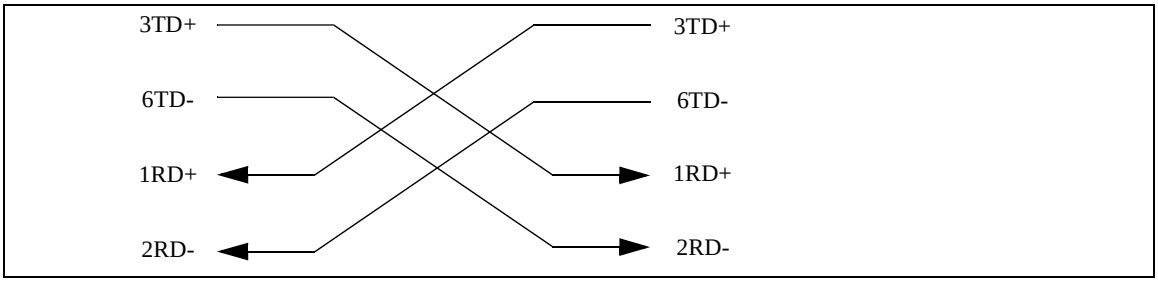
You use this type of connection in these situations:

- the computer you are using does not have access to the Business Communications Manager system through the network
- the Business Communications Manager is not connected to a LAN or WAN
- you have to change the IP address and netmask for the Business Communications Manager system before you connect it to the network

## Set the crossover connections

To connect to the Business Communications Manager using an Ethernet crossover cable, you need a computer equipped with a 10/100 Base T network interface card and TCP/IP protocol. Figure 89 shows the connections required.

**Figure 89** Ethernet crossover cable




## Configure your computer

You must configure your computer before you use it to connect to the Business Communications Manager system.

**Note:** Your interface can differ, depending on what version of system software you are using. The task in this section is to specify IP and subnet addresses for the computer.

1. Click **Start, Settings, Control Panel**.
2. Double click the **Network** icon.
3. Select your TCP/IP adapter, and then click the **Properties** button.
4. Click the **IP Address** tab.

5 Click the **Specify an IP address** option.

6 In the **IP Address** field, enter **`10.10.10.2`**.

7 In the **Subnet Mask** field, enter **`255.255.255.0`**.

8 Click **OK**.

9 Click **OK**.

10 Click **Yes** to restart the PC.

### Connect the Ethernet crossover cable

After you configure the computer, connect the computer to the Business Communications Manager base function tray in the following manner:

1 Shut down the computer.

2 Attach one end of the Ethernet crossover cable to the LAN card on the Business Communications Manager.

3 Connect the other end of the cable to the network interface card on your computer.

4 Start the computer.

5 Log on to the Unified Manager using the default IP address.

6 Use the Quick Start Wizard to create the system configuration.

Refer to the *Business Communications Manager 3.0 Programming Operations Guide* for details about using the wizard. The Programming Operations Guide provides a detailed record about the information that you require to configure basic system programming.

**Warning:** If you change this information on an existing system the telephony programming is erased and the telephony system is disabled for a period of time. The Business Communications Manager also performs a cold start.

## Enter the software keycodes

If you have purchased any of the optional Business Communications Manager applications that require keycode activation, refer to *Business Communications Manager Software Keycode Installation Guide.* The guide provides information about how to obtain the keycodes from the Nortel Networks Keycode Retrieval System (KRS) and how to enter them into the Unified Manager. These codes can be entered after basic system configuration is complete.

## Regenerating keycodes after system replacement

If you replace your media services card (MSC), you need to regenerate all your keycodes to reflect the new system identification. Enter the keycodes after you perform your system data restore. Access the Nortel Networks Keycode Retrieval System (KRS) website for information on how to regenerate keycodes.

# Chapter 6
# Prepare Hardware for Maintenance or Upgrades

This chapter describes how to prepare the Business Communications Manager system for maintenance activities. The following primary topics are covered in this chapter:


- "Precautions" on page 193
- "Special Tools" on page 195
- "Controlled System Shutdown" on page 195
- "Restart the System after Maintenance" on page 197
- "Base Function Tray Maintenance Procedures" on page 198
- "Advanced Function Tray Maintenance Procedures" on page 206
- "Remove and Install the Platform Base Chassis Top Cover" on page 211
- "Use the Backup and Restore Utility" on page 215


## Precautions

Before you replace or update any hardware on the Business Communications Manager system, disconnect the system from the trunk lines.

Remove the top cover to access the standard power supply, I/O card or backplane components. For fan, hard disk or power supply maintenance, remove the appropriate chassis panels. Remove the base function tray to replace any PCI cards. Remove the advanced function tray from the BCM400 platform base chassis to replace or upgrade the hard disk. If applicable, remove the platform base chassis from a server rack.

Observe the following precautions when working inside the Enterprise Edge system. Maintain a clean and static-safe site..

**Danger:** Electrical shock warning.
Disconnect the power cord, telephone cables and network cables before opening the Business Communications Manager platform base chassis. Read and follow installation instructions carefully.

**Danger:** Electrical shock warning.
Partially remove the power supply module from the power supply cage. Do not completely remove the power supply module. **IMPORTANT**: Wait several seconds before removing the power supply module completely from the power supply cage to ensure complete electrical discharge.

**Caution:** Use only a Nortel Networks approved replacement. Contact your account representative for the current list of approved replacement parts.

**Warning:** Maintain a current backup of your system.
When you replace the hard disk, you must restore the Enterprise Edge system programming from the backup.

**Caution:** Do not use an electric or magnetized screwdriver near the hard disk. You can lose the information stored on the disk. Shock can damage the hard disk. Do not drop or hit the hard disk drive.

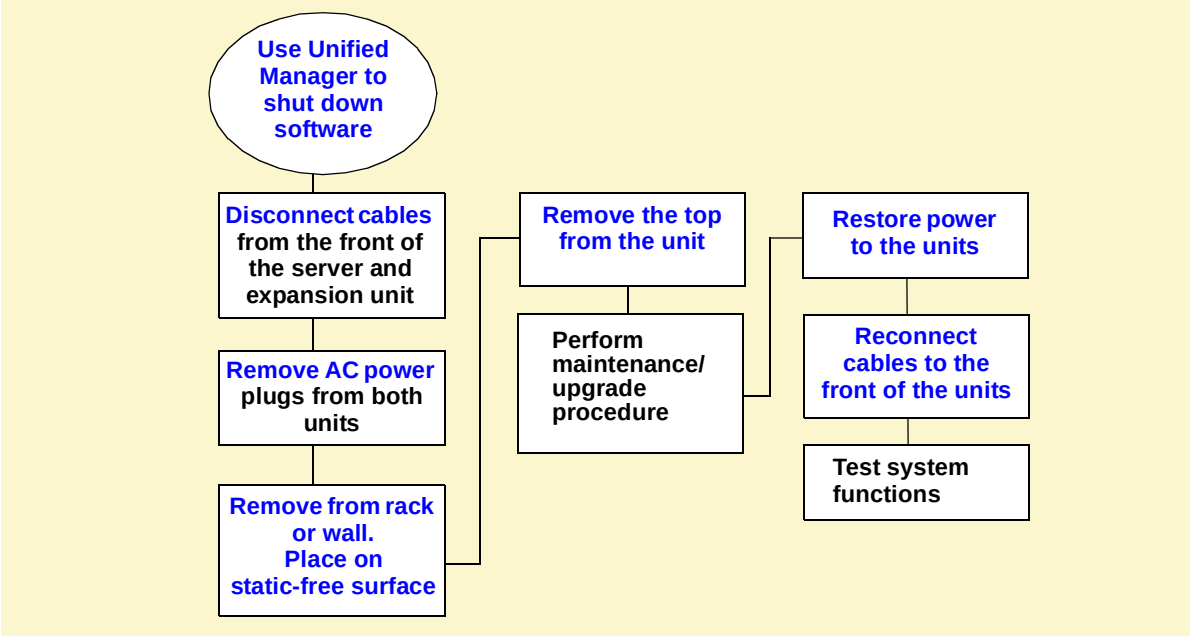
**Warning:** You must remove all of the connections to the Business Communications Manager base function tray before you power the system down.

Failure to disconnect lines before power down can cause damage to the system.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

Figure 90 provides an overview of the process for preparing the Business Communications Manager hardware for maintenance or upgrade procedures.

**Figure 90** Prepare for maintenance overview


Use Unified Manager to shut down software
Disconnect cables from the front of the server and expansion unit
Remove AC power plugs from both units
Remove from rack or wall. Place on static-free surface
Remove the top from the unit
Perform maintenance/ upgrade procedure
Restore power to the units
Reconnect cables to the front of the units
Test system functions

# Special Tools

Before you replace the components, ensure you have the following equipment:

- Phillips screwdriver #2, with a blade 3.5 in. long
- 3/16 inch slot screwdriver
- antistatic wrist grounding strap

**Caution:** You must wear an antistatic grounding strap at all times when handling electronic components. Failure to do so can result in damage to the equipment.

# Controlled System Shutdown

Use the procedures described in this section to perform a controlled software and hardware system shutdown.

The Business Communications Manager system requires a controlled shutdown to guarantee the integrity of the file system. The procedures in this section assume you have access to the Unified Manager.

If a controlled shutdown is not possible, disconnect the power cord from the AC power outlet power-down the Business Communications Manager.

## Shut down the system software

Use this procedure to ensure a safe shutdown of the Business Communications Manager software system.

1. Start a web browser on a computer with a LAN connection to the Business Communications Manager system.
2. Enter the IP address of the Business Communications Manager system and the port number for Business Communications Manager Unified Manager (:6800). For example: **http:// 10.10.10.1:6800**.
3. Click the **Configure** button.
4. Type your user name in the **Login** box. The default user name is supervisor.
5. Type your password in the **Password** box. The default password is visor.
6. Choose **System**.
7. Click the **Logoff** menu and then click **Shutdown**.
8. Click the **Yes** button.
9. Wait until the Status changes to **Complete! It is safe to turn off the system**.

10 Click the **Done** button.

11 Quit the web browser.

12 This procedure is complete.

## Shut down the system hardware

Perform the procedure: "Shut down the system software" on page 195 before attempting this procedure.

**Warning:** Remove all of the connections to the Business Communications Manager before you power the system down.

Failure to disconnect lines before power down can cause damage to the system.

Use this procedure to ensure a safe shutdown of the Business Communications Manager hardware system.

1 Remove the DS256 cables from the front of the Business Communications Manager and expansion unit, if there is one. This includes the data connections on the MSC.

Mark the cables to ensure correct reconnection.

2 Disconnect the Business Communications Manager and expansion unit power cords from the AC outlet.

**Warning:** You must disconnect power from the base platform after you have performed a Unified Manager shutdown. The platform base chassis, cannot start operating again until after power has been disconnected and then reconnected.

3 Ensure you have room to access the part you are working on. Remove the Business Communications Manager platform base chassis from the rack, if necessary.

4 This procedure is complete.

# Restart the System after Maintenance

When you finish your power-off maintenance procedure, restart the Business Communications Manager system in the order described in this section.

## Restore the System to Operation

To restore the system to operation after maintenance activities, follow these steps:

1. Ensure that all cables inside the housing are connected snuggly to the correct boards and excess cables bundled neatly, out of the way.
2. Replace the bezel on the Business Communications Manager platform base chassis, if you removed it.
3. Replace the platform base chassis top cover and replace the screws.
4. If you removed the Business Communications Manager from the rack or wall, replace it.
5. Plug the expansion unit, if there is one, into the AC power source.
6. Plug the Business Communications Manager into the AC power source.

   The Business Communications Manager automatically starts booting.

**Warning:** When you restart the system, all IP clients/voice mail and VoIP ports are not available until the system services restart.

7. Replace all the connectors to the front of the units. The reboot can take several minutes to complete.
8. This procedure is complete.

## Software Restart

Use this procedure to perform a software reboot. If you did not shut the system power down, restart the software.

1. Refer to “Shut down the system software” until you get to step 7. Continue to the next step of this procedure when complete.
2. Select **Reboot** on the **Logoff** menu.
3. Continue with the intructions shown on the display terminal.
4. This procedure is complete.

# Base Function Tray Maintenance Procedures

The base function tray contains the core processing components. To prepare for base function tray removal, perform a software and hardware shutdown. Use the Unified manager interface to properly deactivate and isolate the Business Communications Manager from the network. Set up the server for maintenance, as described in “Shut down the system hardware” on page 196.

Use this procedure only under the following conditions:

- to replace the MSC, modem, memory DIMMs, battery, PEC III, or WAN (if applicable)
- to replace the base function tray. Remove the components from the old base function tray and install in the replacement base function tray.

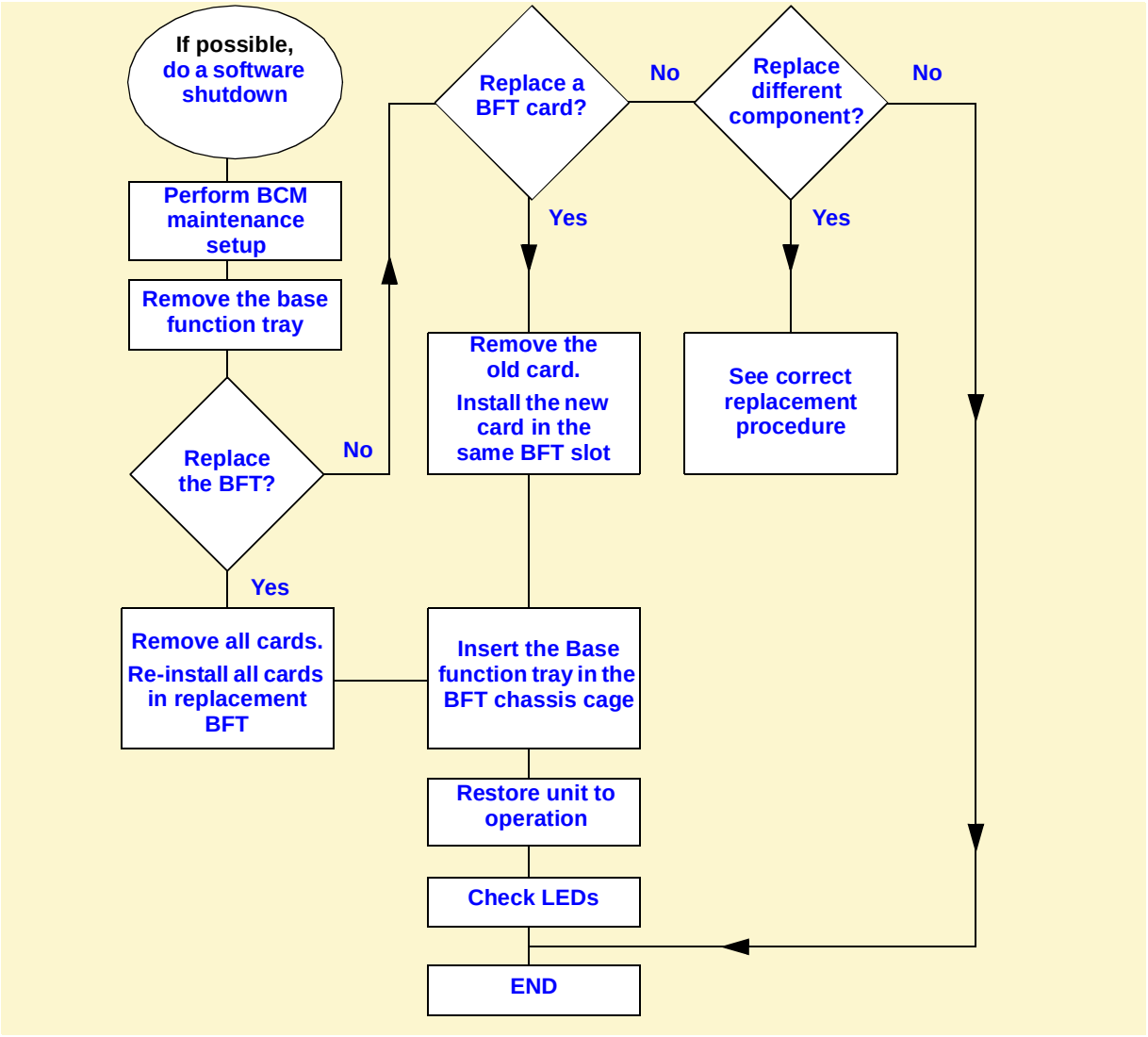
**Danger:** Electrical shock warning. Disconnect the power cord, telephone cables and network cables before opening the computer. Read and follow installation instructions carefully.

**Caution:** Use only a Nortel Networks approved replacement. Contact your account representative for the current list of approved replacement parts.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

Use the flow chart shown in Figure 91 as a summary guide to replace the base function tray.

**Figure 91** Base function tray replacement overview



## Remove the base function tray

This procedure describes how to remove the base function tray to perform maintenance or replacement activities.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

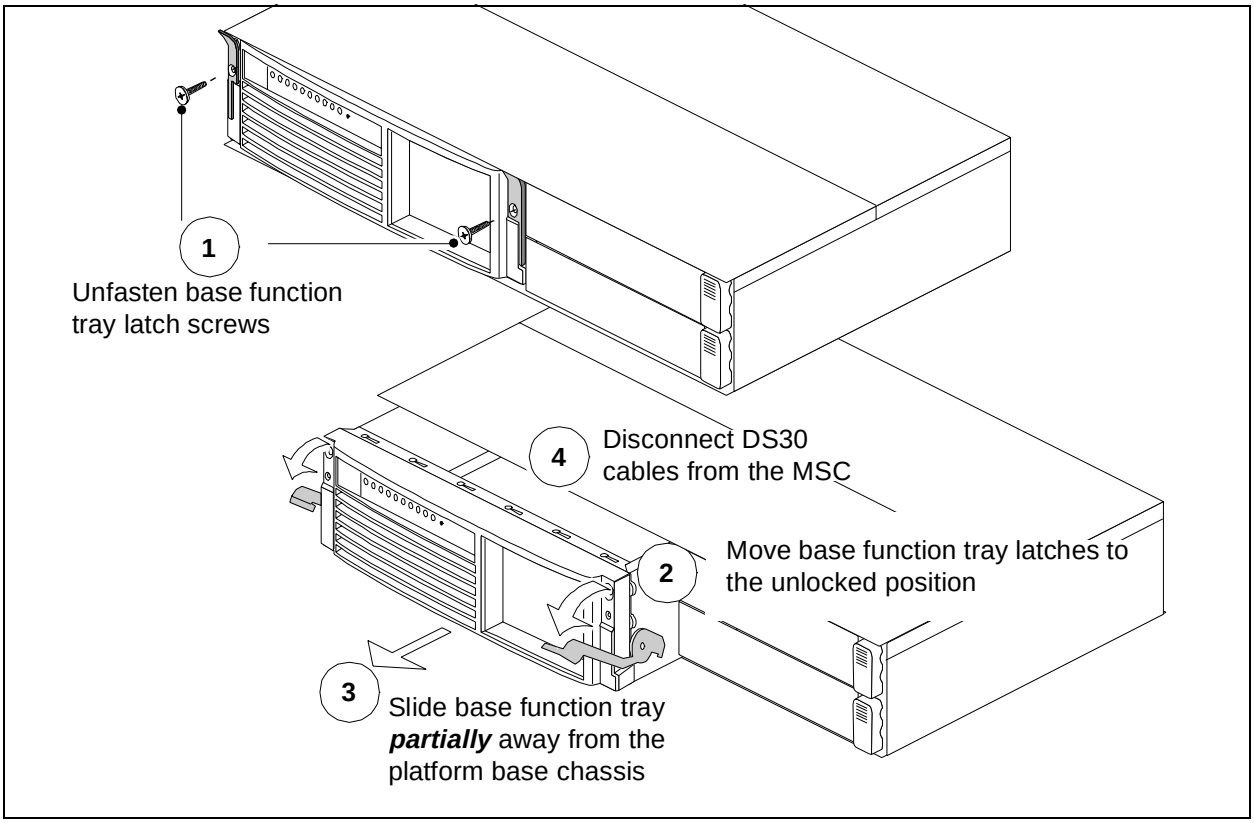
**Warning:** Use care when removing or inserting the Base function tray. Do not forcefully remove or insert the base function tray. You could damage or stretch the cables.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

Use the following steps to remove the base function tray from the platform base chassis:

1. If you still have access to the Unified Manager, shut down the system using the Shutdown command. For details refer to “Shut down the system software” on page 195. Otherwise, skip to step 2.
2. Set up the server for maintenance, as described in “Shut down the system hardware” on page 196.
3. Disconnect the Business Communications Manager from the AC power outlet.
4. Disconnect any connectors from the front of the base function tray.
5. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
6. Remove the platform base chassis top cover. Refer to “Remove the platform base chassis top cover” on page 211.
7. Remove the base function tray latch screws and place in a safe location.
8. Move the base function tray latches to the unlocked position. See Figure 92.
9. Grasp the base function tray latches and partially remove the base function tray from the platform base chassis. Do not exert force on the DS30 cables or connectors.
10. Disconnect DS30 cable connectors from the media services card. If necessary, remove the WAN card to access the DS30 cables, see “Remove the WAN card” on page 285.

**Figure 92** Remove the base function tray


1
Unfasten base function tray latch screws
4
Disconnect DS30 cables from the MSC
2
Move base function tray latches to the unlocked position
3
Slide base function tray ***partially*** away from the platform base chassis

**11** Remove the base function tray completely from the platform base chassis. Remove the base function tray carefully to prevent damage to the cables and connectors.

**12** Place the base function tray on a flat, clean and static-free surface.

**13** This procedure is complete.

## Install the base function tray

Use this procedure to insert the base function tray in the platform base chassis.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container or work area.

**Warning:** Use care when removing or inserting the Base function tray. Do not forcefully remove or insert the base function tray. You could damage or stretch the cables.

**1** Disconnect the Business Communications Manager from the AC power outlet.

**2** Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.

3 Move the base function tray latches to the unlocked position.

4 Position the base function tray in the correct platform base chassis bay.

5 Partially insert the base function tray into the platform base chassis (see Figure 93).

6 Connect the DS30 connectors to the MSC. If necessary, install the WAN card (see "Install the WAN card" on page 287 - return to this step when complete).

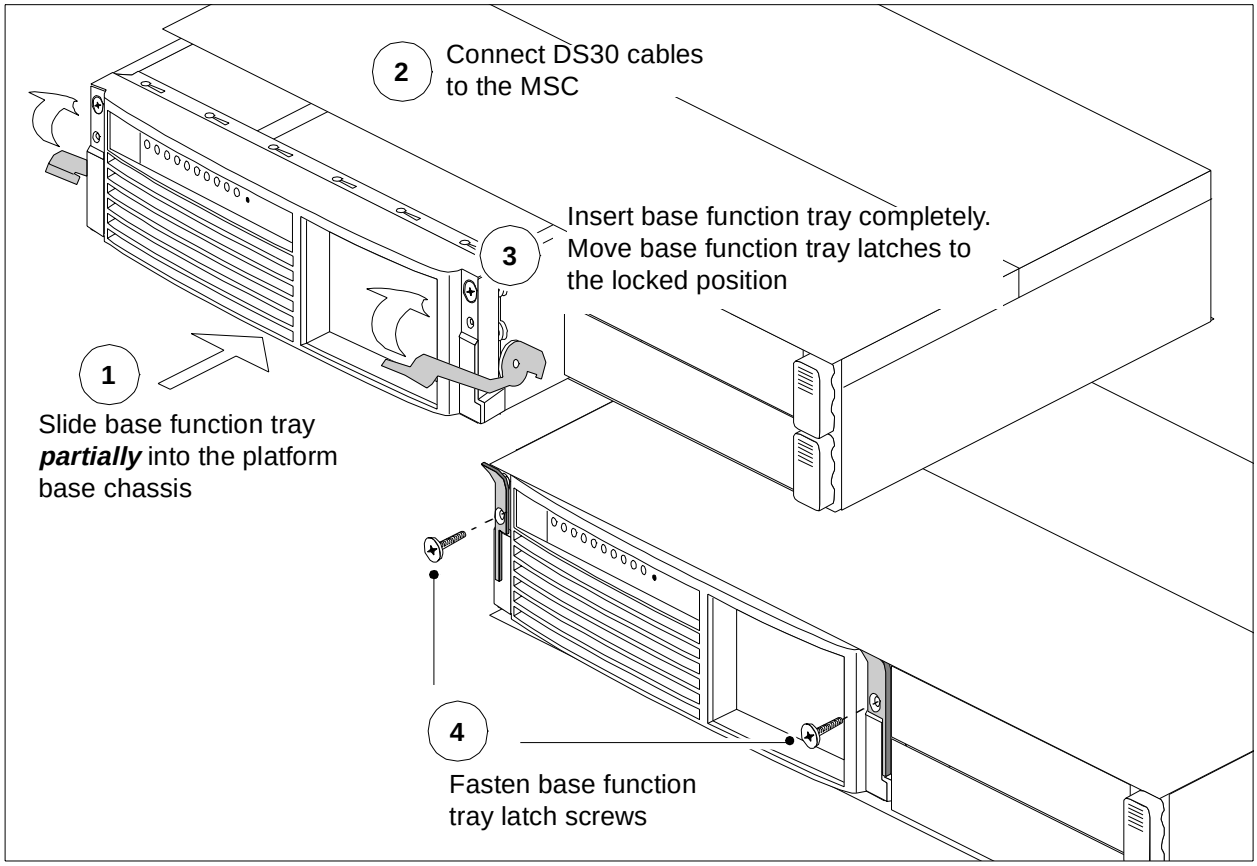
7 If required, install the base function tray bezel (see "Install the base function tray bezel" on page 204). Return to this step when complete.

8 Push the base function tray completely into the chassis. Be careful not to crimp the DS30 cables.

9 Move the base function tray latches to the locked position.

10 Install the base function tray latch screws.

**Figure 93** Install the base function tray


2
Connect DS30 cables to the MSC
3
Insert base function tray completely. Move base function tray latches to the locked position
1
Slide base function tray ***partially*** into the platform base chassis
4
Fasten base function tray latch screws

11 Insert all connectors in the correct locations on the base function tray face.

12 Restore the Business Communications Manager system to operation. See: "Restart the System after Maintenance" on page 197.

13 Observe the system status monitor LEDs to ensure the base function tray initializes correctly.

14 This procedure is complete.

## Remove the base function tray bezel

Use this procedure to remove the base function tray bezel. Remove the base function tray bezel to remove or install the PCI cover plate (during processor card removal or installation).

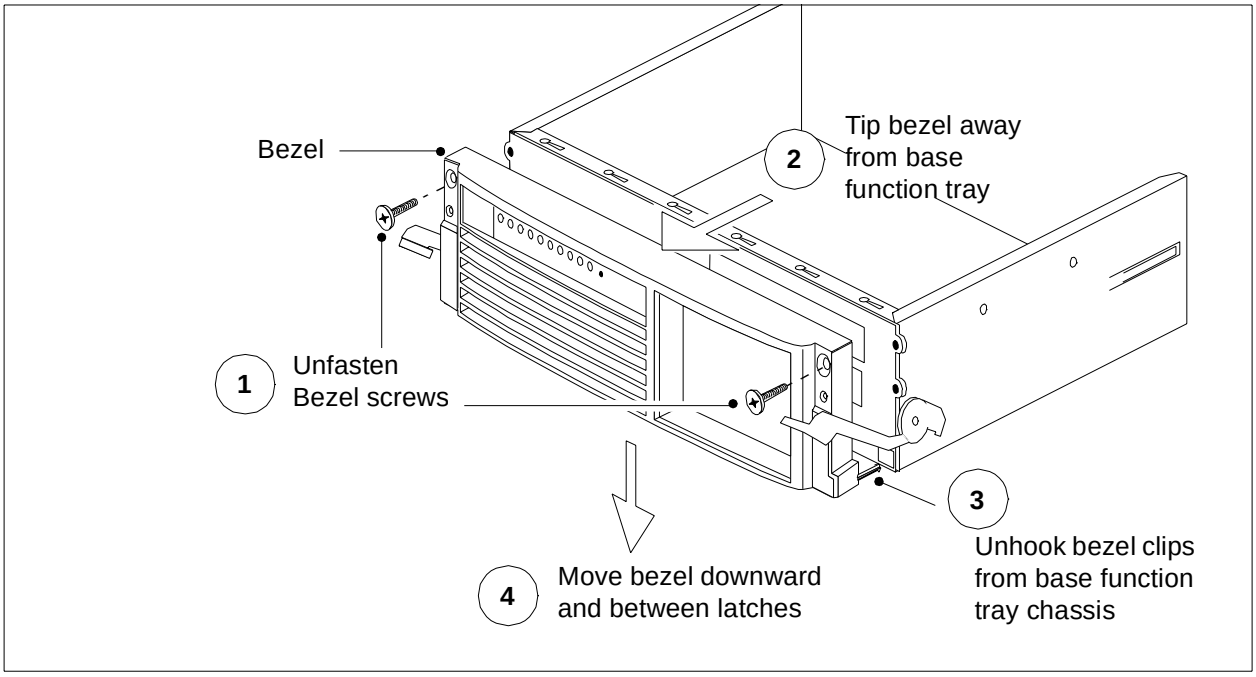
**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

**Warning:** Use care when removing or inserting the Base function tray. Do not forcefully remove or insert the base function tray. You could damage or stretch the cables.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

1. If you still have access to the Unified Manager, shut down the system using the Shutdown command. For details refer to "Shut down the system software" on page 195. Otherwise, skip to step 2.
2. Set up the server for maintenance, as described in "Shut down the system hardware" on page 196.
3. Disconnect the Business Communications Manager from the AC power outlet.
4. Disconnect any connectors from the front of the base function tray.
5. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
6. Remove the base function tray latch screws and place in a safe location.
7. Move the base function tray latches to the unlocked position. See Figure 92.
8. Grasp the base function tray latches and partially remove the base function tray from the platform base chassis. Do not exert force on the DS30 cables or connectors.
9. Unfasten the bezel screws from the base function tray face. Place the screws in a safe location.
10. Pull and tip the bezel away from the base function tray until the bezel clips are clear of the base function tray chassis. Move the bezel in a downward direction between the base function tray latches. Place the bezel in a safe location. See Figure 94.

**Figure 94** Remove the base function tray bezel




**11** This procedure is complete.

## Install the base function tray bezel

Use this procedure to install the base function tray bezel.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container or work area.

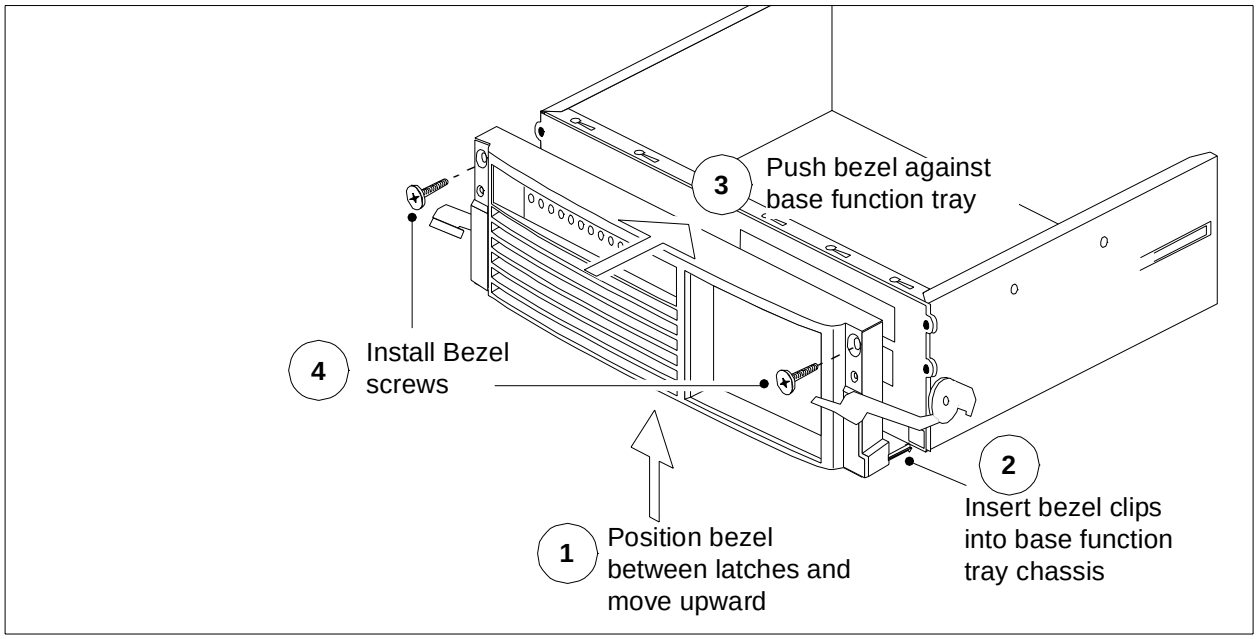
**Warning:** Use care when removing or inserting the Base function tray. Do not forcefully remove or insert the base function tray. You could damage or stretch the cables.

1. Disconnect the Business Communications Manager from the AC power outlet.
2. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
3. Remove the base function tray latch screws (if applicable). Place the screws in a safe location.
4. Move the base function tray latches to the unlocked position.
5. Position the bezel below and between the base function tray latches. Lift the bezel until the bezel clips line-up with the corresponding base function tray bezel holes.
6. Tilt the bezel forward, then push the bottom of the bezel into the base function tray chassis to engage the bezel clips.

7 Push on the face of the bezel so that it rests flush with the face of the base function tray chassis.

8 Install the base function tray bezel screws. See Figure 95.

**Figure 95** Install the base function tray bezel




9 If required, install the base function tray in the platform base chassis. Refer to "Install the base function tray" on page 201. Continue to the next step of this procedure when complete.

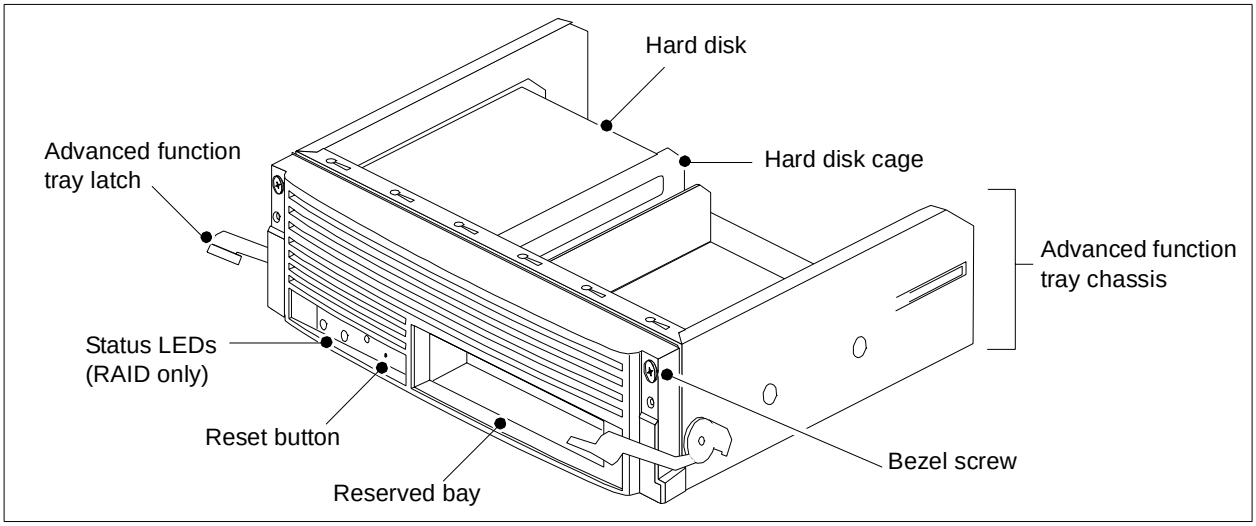
10 This procedure is complete.

# Advanced Function Tray Maintenance Procedures

This procedure applies only to the BCM400 platform. This procedure describes how to remove and install the advanced function tray in the platform base chassis. Use this procedure for maintenance purposes.

The advanced function tray (AFT) houses the hard disk or RAID components for the BCM400 platform (see Figure 96). For further information see also “BCM400 advanced function tray (AFT)” on page 49.

**Figure 96** Advanced function tray




For information on how to replace the hard disk, refer to “Remove a hard disk cage from a BCM400 AFT chassis” on page 223.

**Danger:** Electrical shock warning.
Disconnect the power cord, telephone cables and network cables before opening the Business Communications Manager platform base chassis.
Read and follow installation instructions carefully.

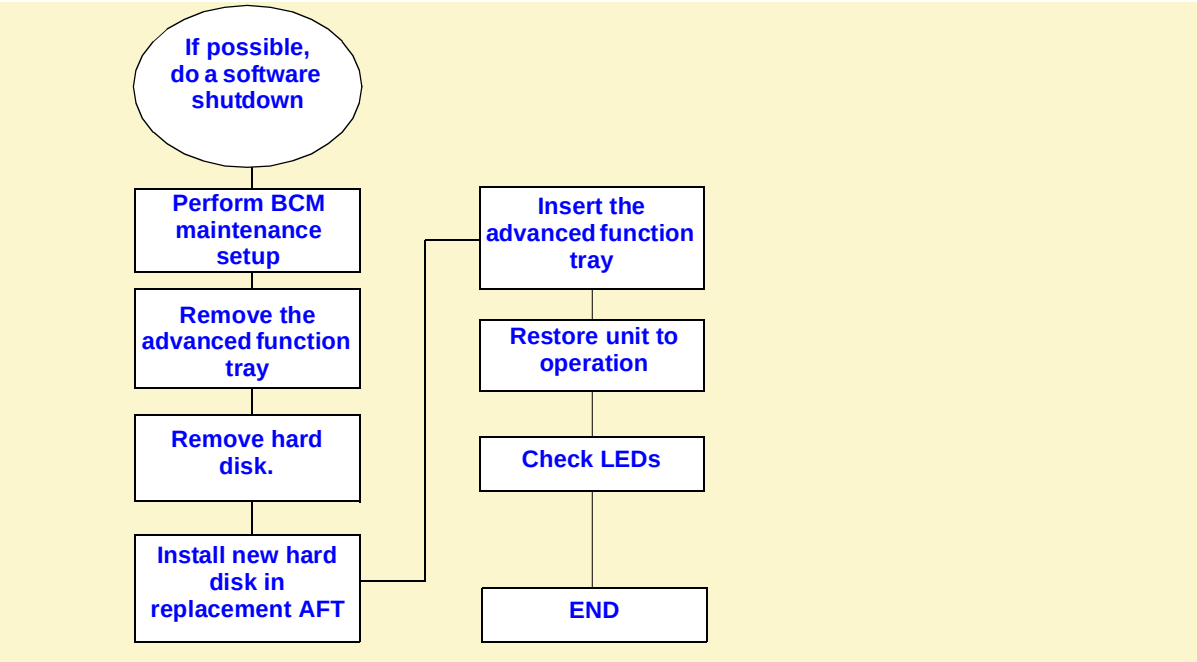
**Caution:** Use only a Nortel Networks approved replacement. Contact your account representative for the current list of approved replacement parts.

**Warning:** Use care when removing or inserting the advanced function tray. Do not forcefully remove or insert the advanced function tray. You could damage or stretch the cables.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container or work area.

Use the flow chart shown in Figure 97 as a summary guide to maintain the advanced function tray.

**Figure 97** Advanced function tray replacement overview


If possible, do a software shutdown
Perform BCM maintenance setup
Remove the advanced function tray
Remove hard disk.
Install new hard disk in replacement AFT
Insert the advanced function tray
Restore unit to operation
Check LEDs
END

## Remove the advanced function tray

Use this procedure to remove the advanced function tray from the BCM400 platform base chassis.

**Warning:** Use care when removing or inserting the advanced function tray. Do not forcefully remove or insert the advanced function tray. You could damage or stretch the cables.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container or work area.

1. If you still have access to the Unified Manager, shut down the system using the Shutdown command. For details refer to “Shut down the system software” on page 195. Otherwise, skip to step 2.
2. Set up the server for maintenance, as described in “Shut down the system hardware” on page 196.
3. Disconnect the Business Communications Manager from the AC power outlet.
4. Remove the platform base chassis top cover (see “Remove the platform base chassis top cover” on page 211). Return to this step when complete.

5 Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.

6 Remove the advanced function tray latch screws (see Figure 98). Place the screws in a safe location.

7 Move the advanced function tray latches to the unlock position.

8 Grasp the advanced function tray latches and partially remove the unit from the platform base chassis. Do not exert force on the hard disk power cables and connectors.

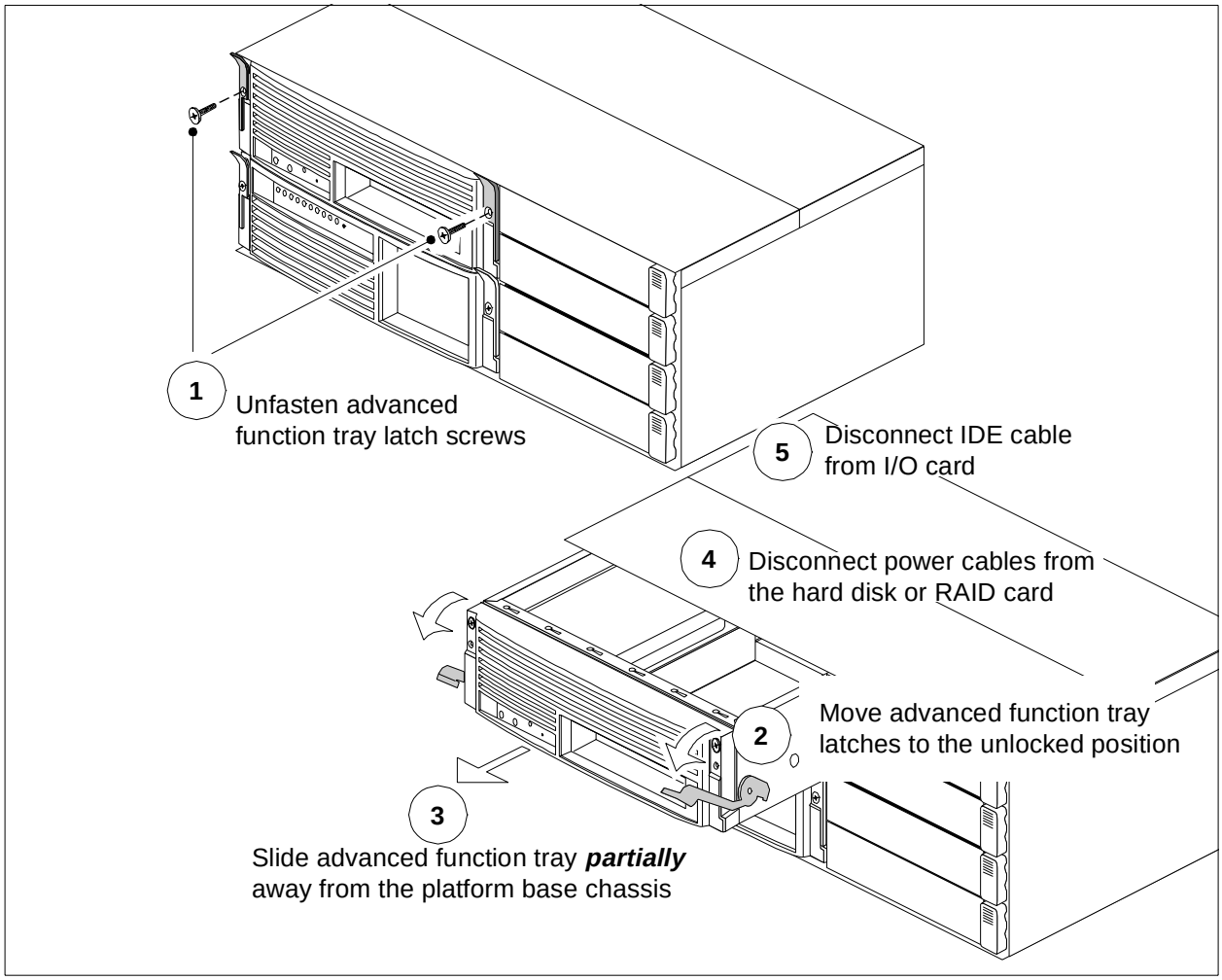
9 Disconnect hard disk power cable connectors.

10 Disconnect the IDE connector.

11 Remove the advanced function tray completely from the platform base chassis.

12 Place the advanced function tray on a flat, clean and static-free surface. If you need to remove the hard disk component, refer to See “Remove a hard disk cage from a BCM400 AFT chassis” on page 223

**Figure 98** Remove the advanced function tray


1
Unfasten advanced function tray latch screws
5
Disconnect IDE cable from I/O card
4
Disconnect power cables from the hard disk or RAID card
2
Move advanced function tray latches to the unlocked position
3
Slide advanced function tray ***partially*** away from the platform base chassis

13 This procedure is complete.

## Install the advanced function tray

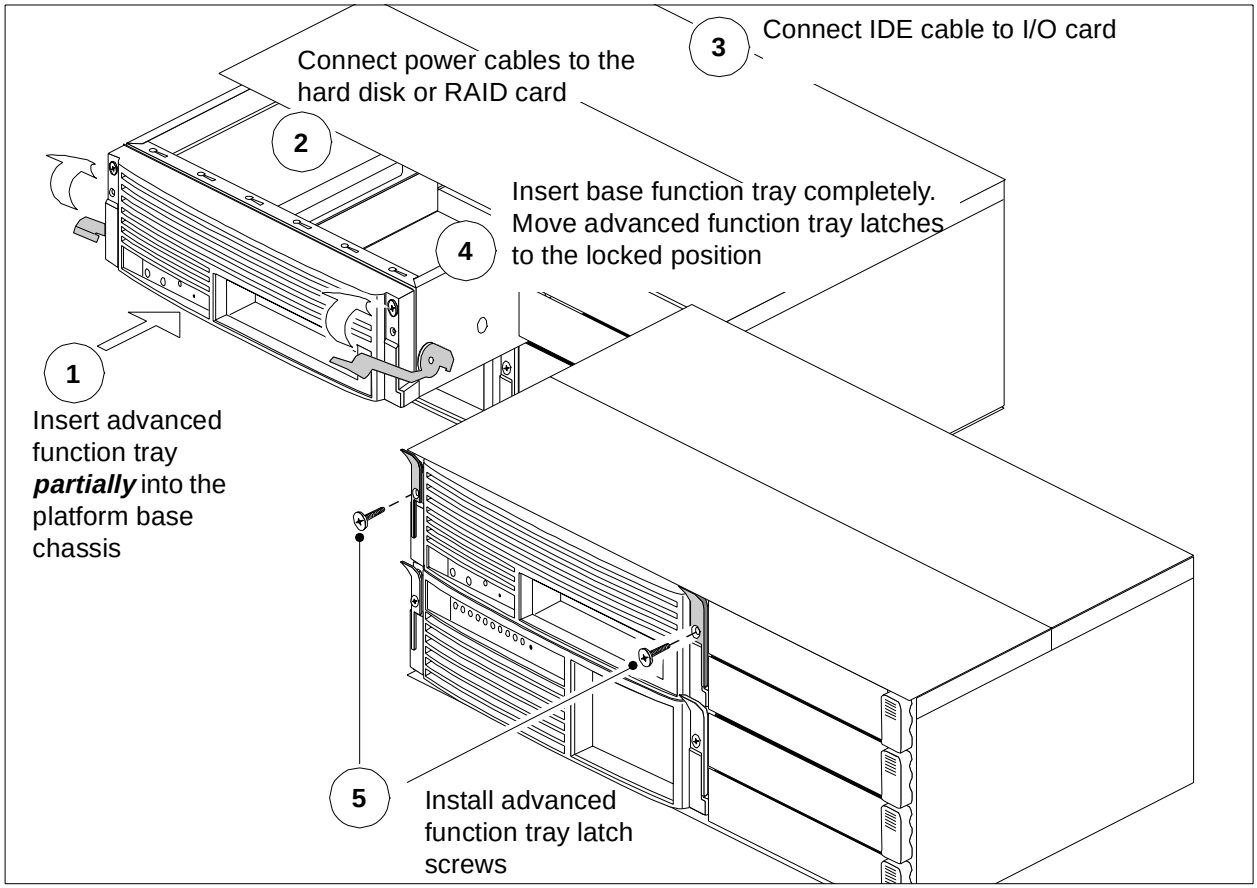
Use this procedure to install the advanced function tray in the platform base chassis.

**Warning:** Use care when removing or inserting the advanced function tray. Do not forcefully remove or insert the advanced function tray. You could damage or stretch the cables.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container or work area.

1. Disconnect the Business Communications Manager from the AC power outlet.
2. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
3. Remove the platform base chassis top cover - see “Remove the platform base chassis top cover” on page 211.
4. Remove the advanced function tray latch screws. Place the screws in a safe location. If the screws are already removed, skip to the next step.
5. Move the advanced function tray latches to the unlocked position.
6. Position the advanced function tray in the correct platform base chassis slot.
7. Partially insert the advanced function tray into the platform base chassis (see Figure 99).
8. Connect the hard disk power cable connectors. Use the first connector. Tuck any excess cable under the hard disk.
9. Connect the IDE connector.
10. Push the advanced function tray completely into the chassis. Be careful not to crimp the cables (see Figure 99).
11. Move the advanced function tray latches to the locked position.
12. Install the advanced function tray latch screws.
13. Install the platform base chassis top cover. Refer to “Install the platform base chassis top cover” on page 213.
14. Restore the Business Communications Manager to operation. See: “Restart the System after Maintenance” on page 197.
15. Observe the system status display LEDs to ensure the advanced function tray initializes correctly.

**Figure 99** Install the advanced function tray


3
Connect IDE cable to I/O card
Connect power cables to the hard disk or RAID card
2
Insert base function tray completely. Move advanced function tray latches to the locked position
4
1
Insert advanced function tray ***partially*** into the platform base chassis
5
Install advanced function tray latch screws

**16** This procedure is complete.

# Remove and Install the Platform Base Chassis Top Cover

Use the procedures in this section to either remove or install the top cover of the platform base chassis. You must remove the top cover to access the cabling or hardware components such as standard power supply, I/O card or backplanes.

## Remove the platform base chassis top cover

Use this procedure to remove the top cover of the BCM200 or BCM400 platform base chassis. This procedure assumes that you intend to perform maintenance activities. Do not operate the Business Communications Manager with the top cover removed. Do not leave the top cover removed for extended periods of time.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container or work area.

1. If you still have access to the Unified Manager, shut down the system using the Shutdown command. For details refer to “Shut down the system software” on page 195. Otherwise, skip to step 2.
2. Set up the server for maintenance, as described in “Shut down the system hardware” on page 196.
3. Disconnect the Business Communications Manager from the AC power outlet.
4. If required, remove the platform base chassis from the server rack.
5. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
6. Remove the two top cover screws located at the rear of the platform base chassis. Place the screws in a safe location.
7. Lift the back of the cover and slide rear-ward until it disengages from the platform base chassis. Refer to Figure 101 or Figure 101.
8. Lift the top cover up and away from the platform base chassis. Place the cover in a safe location.

**Figure 100** Remove the BCM200 top cover

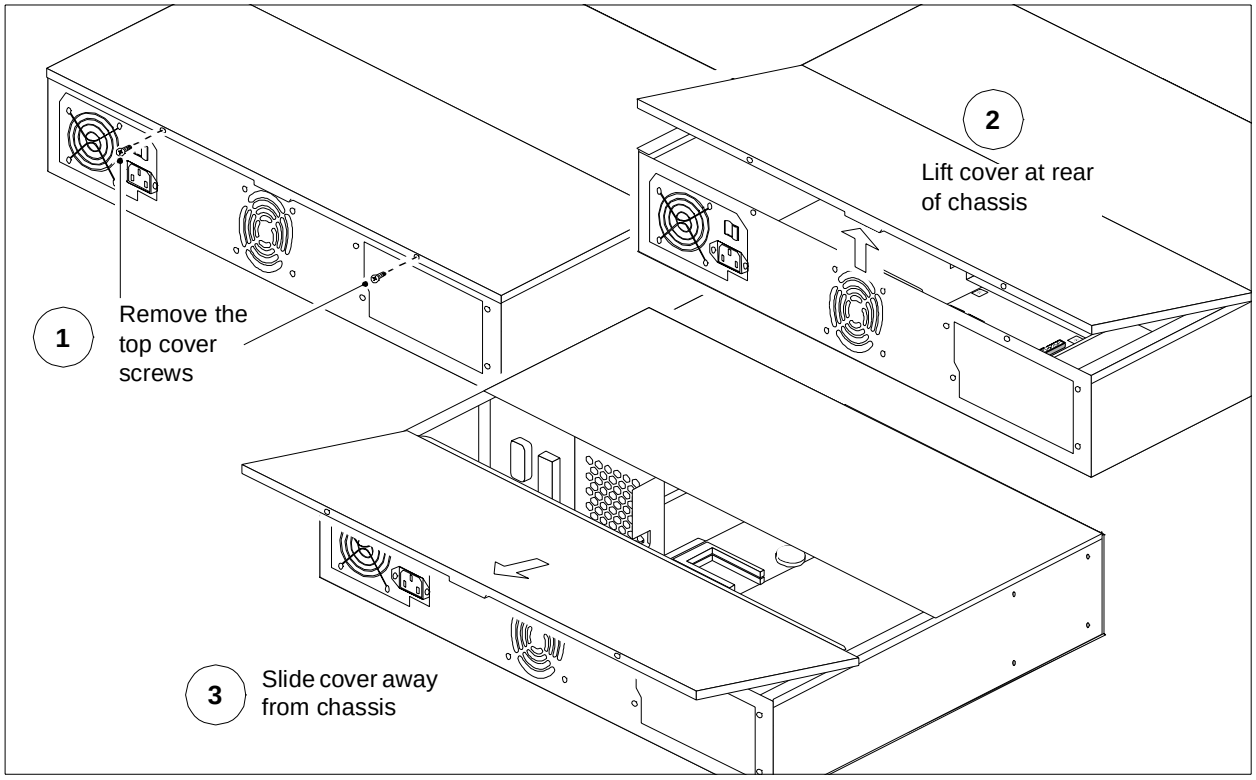
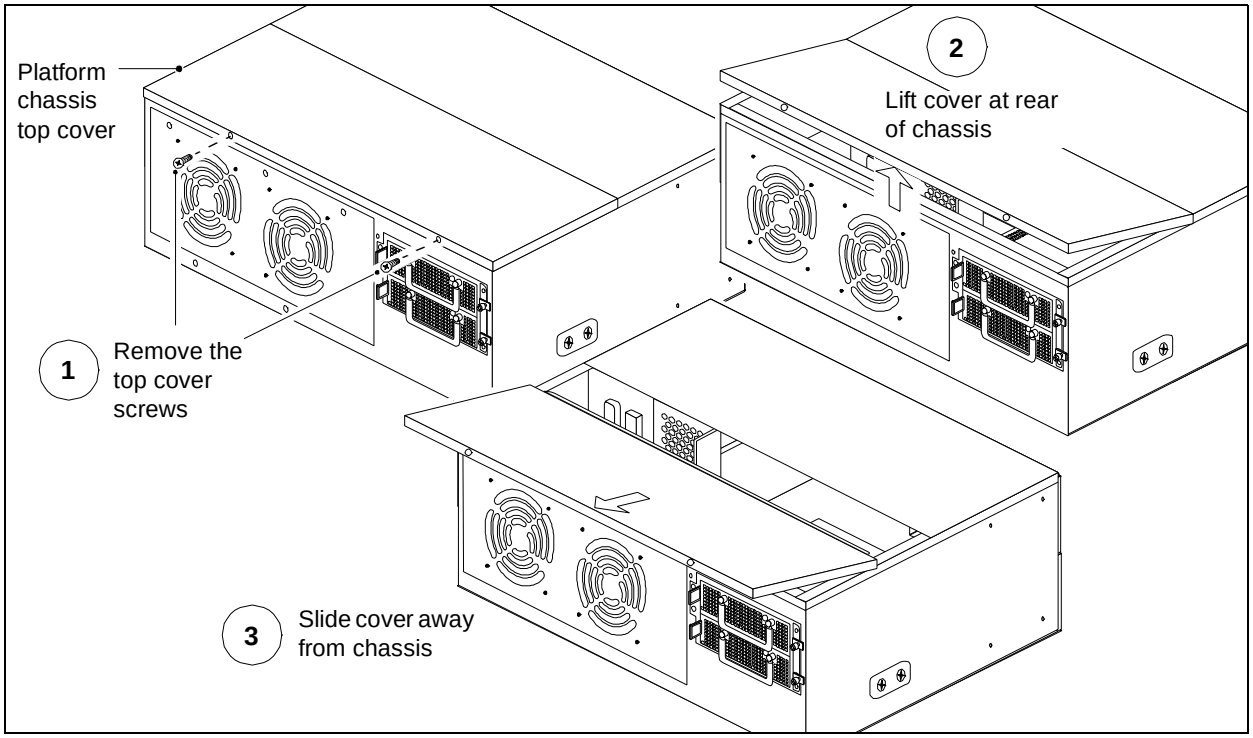



**Figure 101** Remove the BCM400 top cover




**9** This procedure is complete.

## Install the platform base chassis top cover

Use this procedure to install the top of the platform base chassis cover. This procedure assumes that maintenance or installation activities are complete and that you are ready to start the Business Communications Manager.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container or work area.

1. Disconnect the Business Communications Manager from the AC power outlet.
2. If required, remove the platform base chassis from the server rack.
3. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
4. Set the top cover on the platform base chassis.
5. Slide the top cover forward until the cover engages with the platform base chassis.
6. Press the top cover down until it rests on the chassis. Refer to Figure 102 or Figure 103.
7. Install the two top cover screws at the rear of the platform base chassis.

**Figure 102** Install the BCM200 top cover

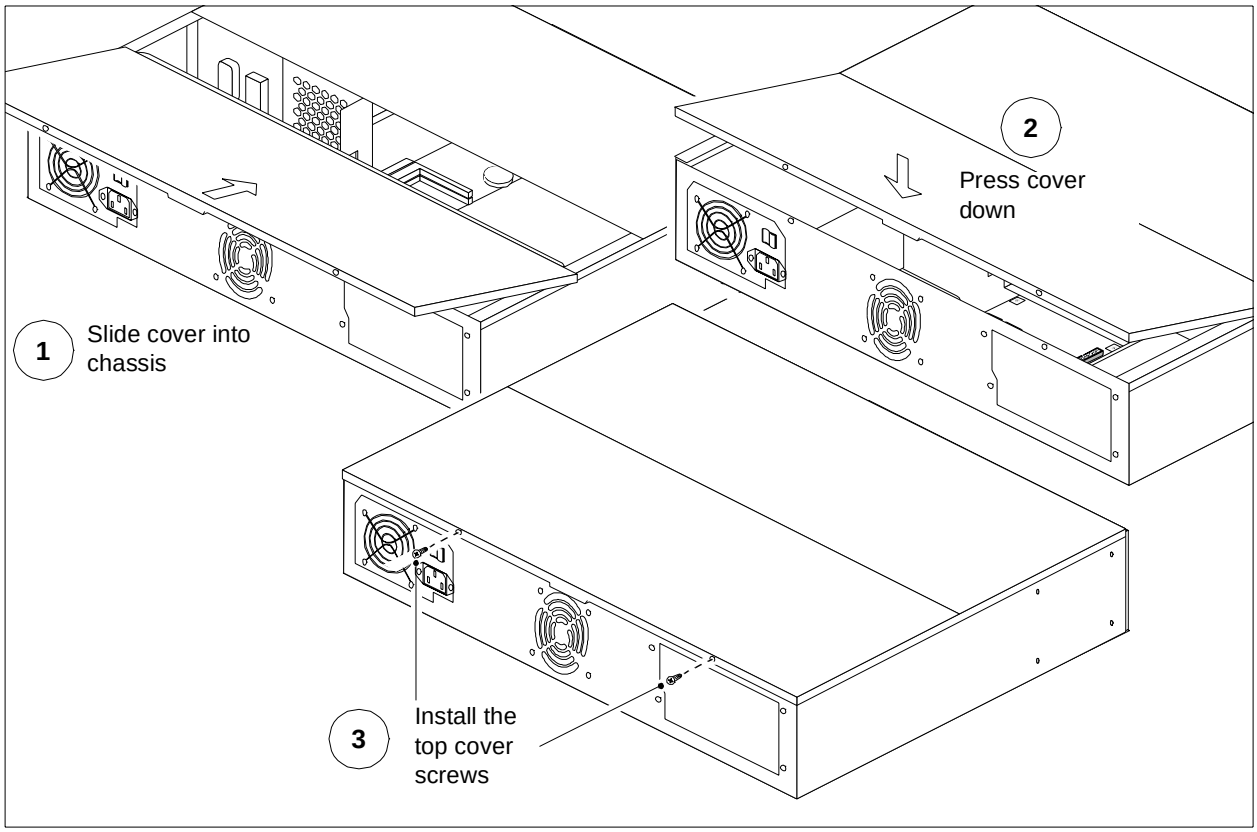
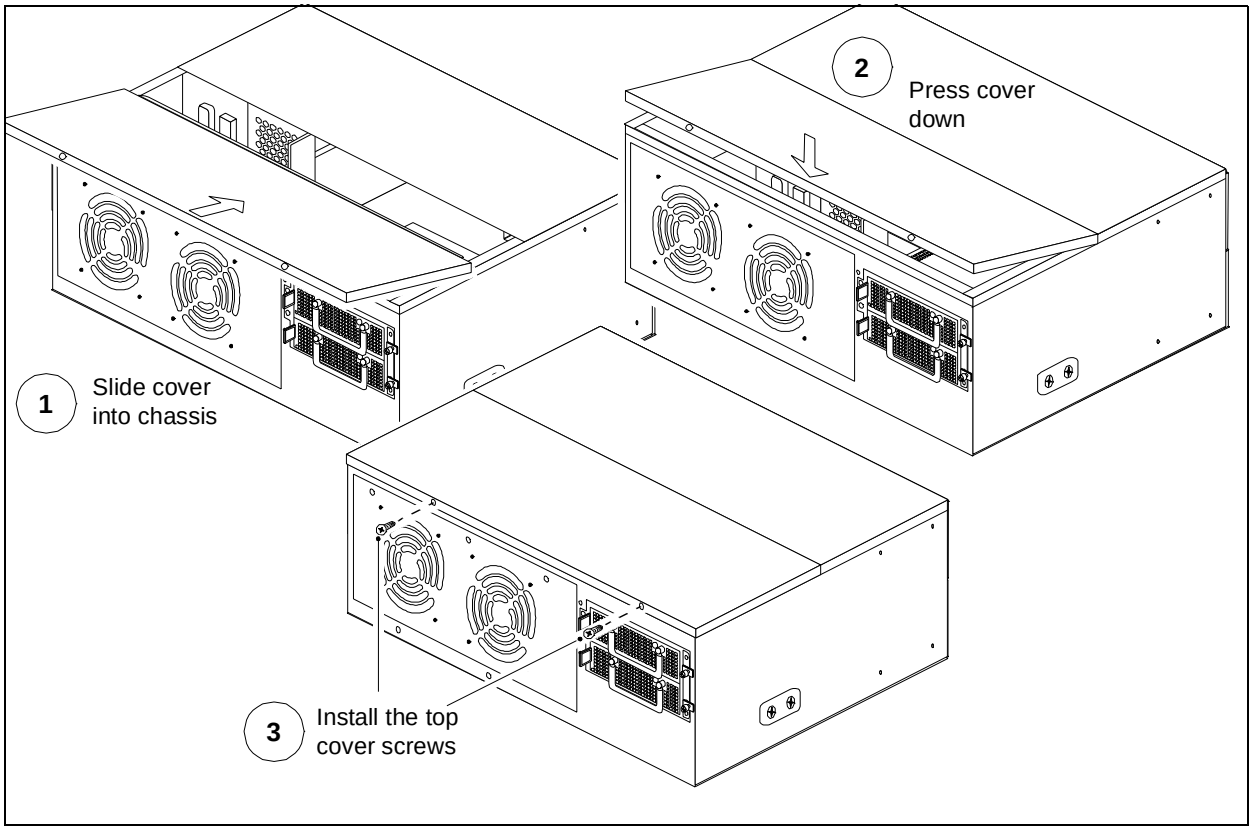


**Figure 103** Install the BCM400 top cover




**8** This procedure is complete.

# Use the Backup and Restore Utility

The backup and restore utility (BRU) provides a means to preserve the integrity of your Enterprise Edge system operating system software and configuration data.

Use the BRU if you need to replace the following hardware:

- Hard disk (see Chapter 7, “Hard Disk Replacement Procedures”)
- Media Services Card (MSC) (see Chapter 10, “Replace Data Cards and Processing Hardware”)

Before you perform any substantial maintenance on the Enterprise Edge, save your data to a safe storage module location elsewhere in the network. After hardware maintenance is complete, restore the data to your Enterprise Edge. Access the BRU through the Unified Manager main page.

For further instructions on how to operate the BRU, refer to the Enterprise Edge *Management User Guide*.

# Chapter 7
# Hard Disk Replacement Procedures

This chapter describes how to replace the hard disks and hard disk cage assembly in the platform base chassis. The replacement procedures describe both the standard and RAID hard disk configurations.

For information on how to monitor and troubleshoot the hard disk in a standard or RAID configuration, refer to Chapter 15, “System Monitoring and Troubleshooting”.

This chapter contains the following primary topics:


- “Install a RAID System” on page 219
- “Replace a RAID configuration hard disk” on page 220
- “Remove a Hard Disk Cage” on page 221
- “Install a Hard Disk Cage” on page 225
- “Replace a Hard Disk in the Hard Disk Cage” on page 228
- “Initialize the Hard Disk” on page 236


The hard disk is a core software and data storage component. For BCM200 platform base configurations, the hard disk assembly installs at the rear of the platform base chassis. For BCM400 platform base configurations, the hard disk assembly installs in the advanced function tray (AFT) chassis.

Use the procedures described in this chapter under the following conditions:

- if you need to replace an existing hard disk in a standard configuration
- if you need to upgrade to a RAID configuration
- if you need to replace a hard disk in a RAID configuration
- if you need to replace a RAID card

Remember to take suitable precautions when working inside the Enterprise Edge system. Maintain a clean and static-safe site.

**Danger:** Electrical shock warning.
Disconnect the power cord, telephone cables and network cables before opening the Business Communications Manager platform base chassis. Read and follow installation instructions carefully.

**Caution:** Use only Nortel Networks approved replacement components. Contact your account representative for the current list of approved replacement parts.

Maintain a current backup of your system. When you replace the hard disk, you need to restore the Enterprise Edge system programming from the backup using the backup and restore utility (BRU). If you do not have a current backup, you need to re-enter configuration data. For further information on how to perform a backup or restore, refer to the *Management User Guide*.

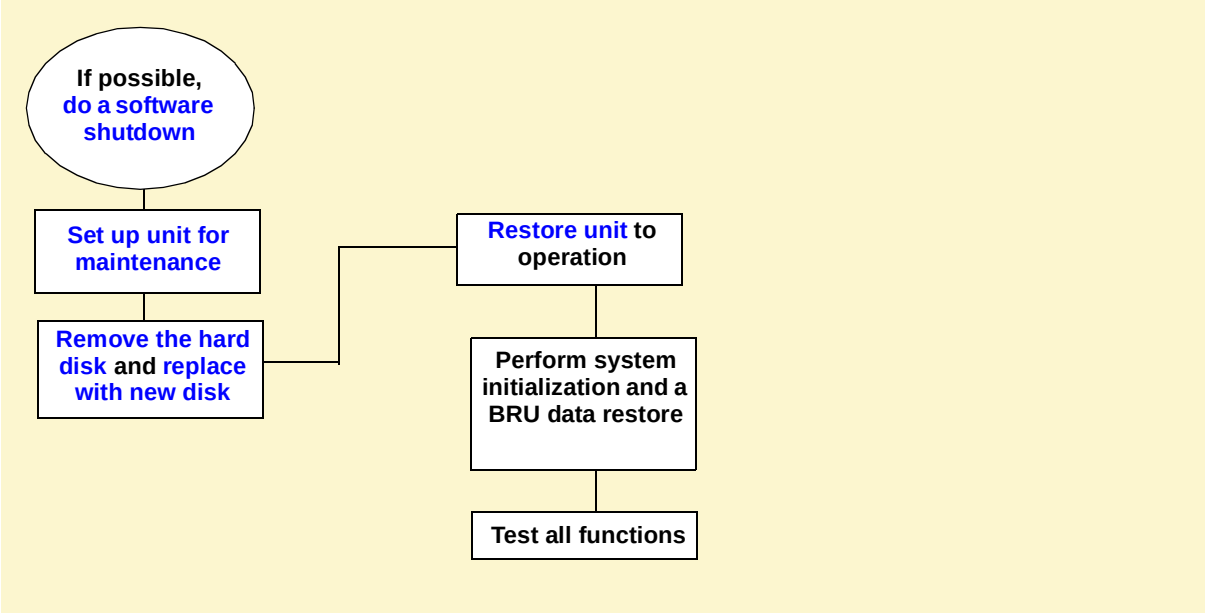
**Caution:** Do not use an electric or magnetized screwdriver near the hard disk. You can lose the information stored on the disk. Shock can damage the hard disk. Do not drop or hit the hard disk drive.

**Warning:** You must remove all of the connections to the Business Communications Manager base function tray before you power the system down. Failure to disconnect lines before power down can cause damage to the system.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

Figure 104 provides an overview of the hard disk replacement process.

**Figure 104** Hard disk replacement overview


If possible, do a software shutdown
Set up unit for maintenance
Remove the hard disk and replace with new disk
Restore unit to operation
Perform system initialization and a BRU data restore
Test all functions

# Install a RAID System

Use this procedure to upgrade an existing, standard BCM200 or BCM400 single disk configuration to a RAID configuration.

Perform the following:

1. Obtain the correct RAID field redundancy or upgrade components.
2. If you still have access to the Unified Manager, shut down the system by following the instructions in "Shut down the system software" on page 195. Otherwise, skip to step 2.
3. Set up the server for maintenance, as described in "Shut down the system hardware" on page 196. Continue to the next step of this procedure when complete.
4. Disconnect the Business Communications Manager from the AC power source.
5. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface on the BCM platform base chassis.
6. If applicable, remove the standard configuration hard disk cage from the BCM200 platform base chassis or BCM400 advanced function tray. Refer to "Remove a Hard Disk Cage" on page 221. Continue to the next step of this procedure when complete.
7. Remove the original programmed hard disk from the standard hard disk cage. Install and use the original programmed hard disk as the primary disk in the RAID configuration (see Figure 113). For further information on how to replace the hard disks, refer to "Install a hard disk into a standard configuration hard disk cage" on page 232. Continue to the next step of this procedure when complete.

**Note:** The new hard disk storage capacity (in MB) must be greater than or equal to the existing hard disk. Equipment provided by Nortel Networks assures correct hard disk capacity requirements.

8. Install the RAID hard disk cage in your system. For further information, refer to "Install a hard disk cage in a BCM200 platform base chassis" on page 225 or "Install a hard disk cage in a BCM400 platform base chassis" on page 227. Continue to the next step of this procedure when complete.
9. Install the platform base chassis cover and access panel (if required).
10. Restore the Business Communications Manager to operation. Refer to "Restart the System after Maintenance" on page 197. Continue to the next step of this procedure when complete.

After boot-up, the system automatically detects the presence of a RAID configuration and begins the disk initialization and mirroring process. For further information on how to monitor the disk mirror process, refer to "RAID Disk Mirroring" on page 378.

**Note:** RAID disk mirroring can take up to 3+ hours to complete. The Business Communications Manager system continues to operate normally during the disk mirroring process. However, because disk mirroring occupies computing resources, Nortel Networks recommends you perform disk mirroring during a period of low call traffic.

Nortel Networks recommends you perform any system reboot only as required and at the beginning of the disk mirroring process.

**Note:** If this is the first time installation of the RAID upgrade, both primary and mirror status LEDs indicate Green.

**11** This procedure is complete.

## Replace a RAID configuration hard disk

Use this procedure to replace a faulty disk in an existing RAID configuration.

Perform the following:

**1** If you still have access to the Unified Manager, monitor the RAID hard disk activity status. Diagnose hard disk fault conditions and perform maintenance activities if required. For further information, refer to "RAID Disk Mirroring" on page 378. Continue to the next step of this procedure when complete.

**2** Determine if any of the RAID hard disks requires replacement. If you determine a RAID disk is faulty, continue to the next step in this procedure. If you determine no fault exists in the hard disks, go to the last step in this procedure.

**3** If you still have access to the Unified Manager, shut down the system by following the instructions in "Shut down the system software" on page 195. Continue to the next step of this procedure when complete.

**4** Set up the server for maintenance, as described in "Shut down the system hardware" on page 196. Continue to the next step of this procedure when complete.

**5** Disconnect the Business Communications Manager from the AC power source.

**6** Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface on the BCM platform base chassis.

**7** Remove the RAID hard disk cage from the platform base chassis or advanced function tray. Refer to "Remove a Hard Disk Cage" on page 221. Continue to the next step of this procedure when complete.

8 Remove the faulty hard disk (primary or mirror). Refer to "Remove a primary hard disk from a RAID hard disk cage" on page 230 or "Remove a mirror hard disk from a RAID hard disk cage" on page 231. Continue to the next step of this procedure when complete.

9 Install a new hard disk to replace the faulty hard disk. For further information, refer to "Replace a Hard Disk in the Hard Disk Cage" on page 228. Ensure the hard disk cables connect to the correct hard disk (see caution). Continue to the next step of this procedure when complete.

**Caution:** It is vital that you connect the correct IDE ribbon cables to the correct hard disk(s). Connect the primary IDE ribbon cable to the primary hard disk. Connect the mirror IDE ribbon cable to the mirror hard disk

10 Install the RAID hard disk cage in your system. For further information, refer to "Install a hard disk cage in a BCM200 platform base chassis" on page 225 or "Install a hard disk cage in a BCM400 platform base chassis" on page 227. Continue to the next step of this procedure when complete.

11 Restore the Business Communications Manager to operation. Refer to "Restart the System after Maintenance" on page 197.

After boot-up, the system automatically detects the presence of a RAID configuration and begins the disk initialization and mirroring process.

**Note:** RAID disk mirroring takes up to 3 hours to complete. The Business Communications Manager system continues to operate normally during the disk mirroring process. However, because disk mirroring occupies computing resources, Nortel Networks recommends you perform disk mirroring during a period of low call traffic.

**Note:** If this is the first time installation of the RAID configuration, both primary and mirror status LEDs indicate Green.

12 This procedure is complete.

## Remove a Hard Disk Cage

Use the procedures in this section to remove a hard disk cage from either the BCM200 or BCM400 systems. When a hard disk causes problems or fails, remove the hard disk cage from the BCM200 base platform chassis or the BCM400 advanced function tray. Remove the hard disk cage for RAID upgrade, hard disk or RAID card replacement conditions.

For information on how to determine if you have a faulty hard disk, refer to "Monitor standard configuration hard disk status through the Unified Manager" on page 374 or "RAID Disk Mirroring" on page 378.

This section provides the following procedures on how to remove a hard disk cage from the BCM200 and BCM400 platform base chassis.


- "Remove a hard disk cage from a BCM200 platform base chassis" on page 222
- "Remove a hard disk cage from a BCM400 AFT chassis" on page 223


**Warning:** Maintain a current backup of your system configuration on a separate backup network server. Restore the current backup configuration data to a replacement hard disk. For further information on how to perform a backup and restore, refer to the *Management User Guide*.

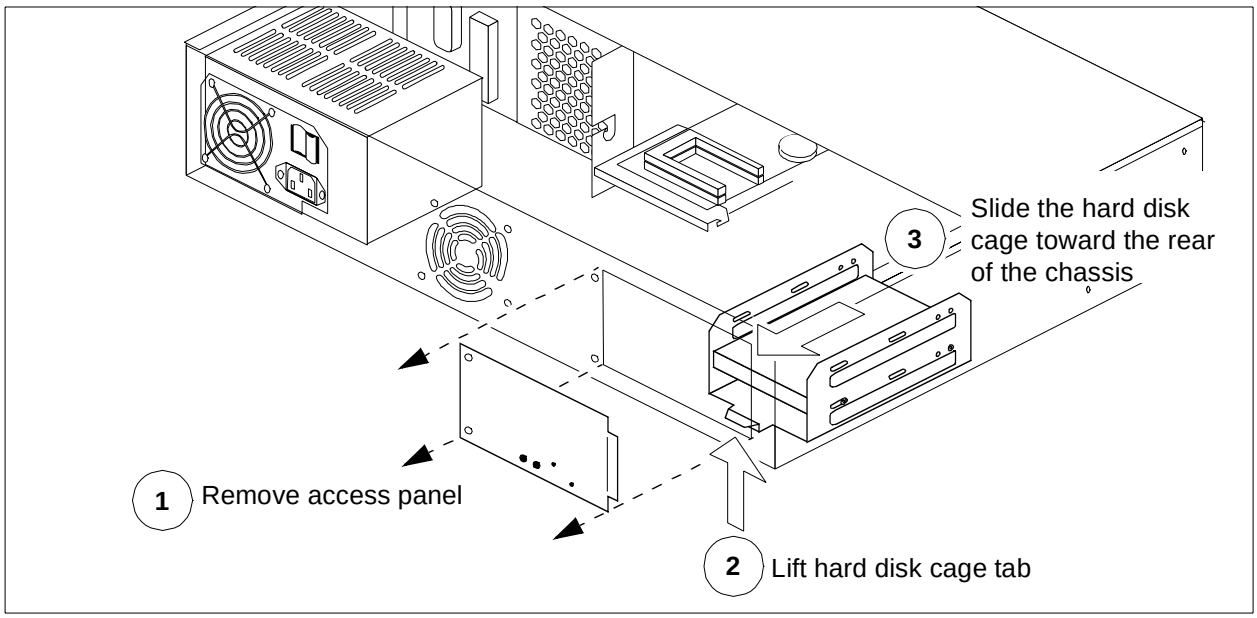
## Remove a hard disk cage from a BCM200 platform base chassis

Use this procedure to remove a standard or RAID configuration hard disk cage from the BCM200 base platform chassis (see also "Replace a Hard Disk in the Hard Disk Cage" on page 228).

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

1. If you still have access to the Unified Manager, shut down the system by following the instructions in "Shut down the system software" on page 195. Otherwise, skip to step 2.
2. Set up the server for maintenance, as described in "Shut down the system hardware" on page 196. Continue to the next step of this procedure when complete.
3. Disconnect the Business Communications Manager from the AC power source.
4. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface on the BCM platform base chassis.
5. Access the hard disk from a panel at the rear of the BCM200 platform base chassis. Remove the hard disk access panel screws (see Figure 105 on page 223). Place the panel and screws in a safe location.
6. If accessible, remove the BCM200 platform base chassis top cover (see "Remove the platform base chassis top cover" on page 211). Continue to the next step of this procedure when complete.
7. Place your fingers under the tab located at the bottom rear of the hard disk cage. Lift firmly on the tab. At the same time, slide the hard disk cage in the direction shown in Figure 105 until the unit detaches from the mounting points on the chassis.
8. Slide the hard disk cage through the access panel and out of the platform base chassis. Do not place strain the hard disk IDE or power cables.
9. Disconnect the hard disk from the system:
   a. Disconnect the power supply connector from the hard disk(s).
   b. Disconnect the IDE connector from the hard disk (or RAID card).

**Figure 105** Detach the hard disk cage from the BCM200 platform base chassis




**10** Remove the hard disk cage completely from the BCM200 platform base chassis. Place the hard disk cage on a flat, clean and static-free surface.

**11** This procedure is complete.

## Remove a hard disk cage from a BCM400 AFT chassis

Use this procedure to remove the BCM400 standard or RAID configuration hard disk cage from the BCM400 advanced function tray. See also "Replace a Hard Disk in the Hard Disk Cage" on page 228.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

**1** If you still have access to the Unified Manager, shut down the system by following the instructions in "Shut down the system software" on page 195. Otherwise, skip to step 2.

**2** Set up the server for maintenance, as described in "Shut down the system hardware" on page 196. Continue to the next step of this procedure when complete.

**3** Disconnect the Business Communications Manager from the AC power source.

**4** Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface on the BCM400 platform base chassis.

**5** Partially remove the BCM400 advanced function tray (see "Remove the advanced function tray" on page 207). Do not to pinch or stretch any cables when sliding the advanced function tray partially out of the platform base chassis.

6 Locate the hard disk or RAID cage in the advanced function tray.

7 Disconnect the hard disk cables from the system:

   a Disconnect the power supply connector from the hard disk(s).

   b Disconnect the IDE connector from the hard disk (or RAID card).

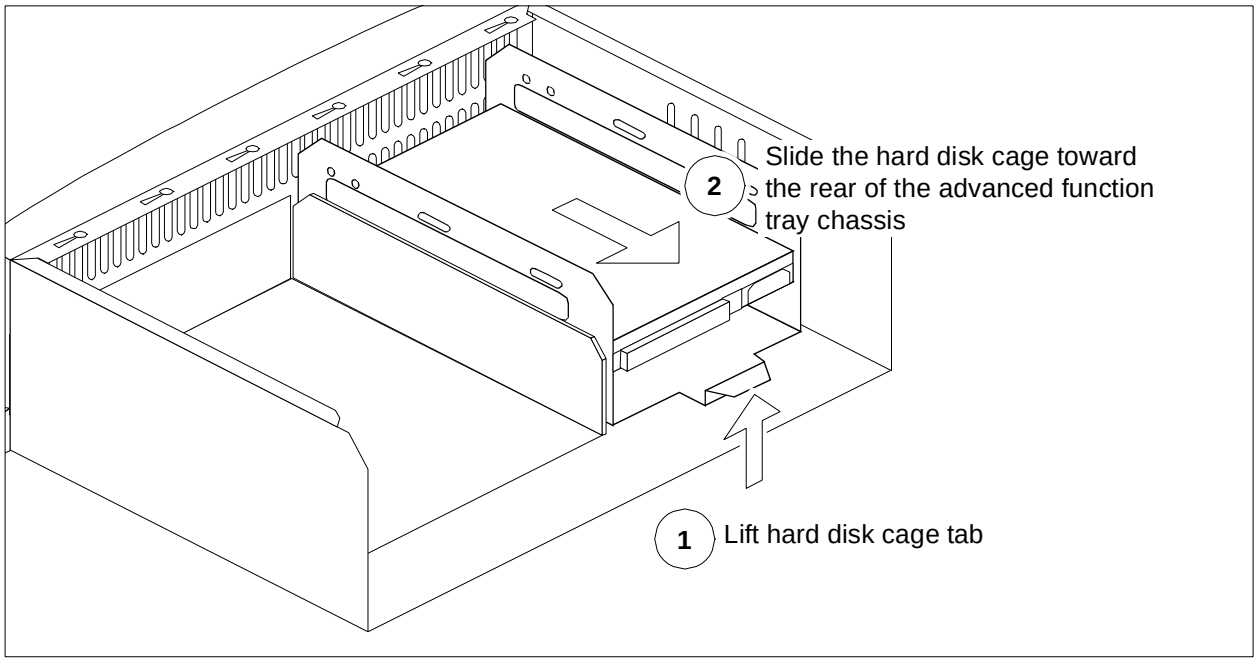
8 Carefully remove the advanced function tray completely from the platform base chassis. Do not pinch or stretch any cables when sliding the advanced function tray away from the platform base chassis.

9 Remove the transportation hard disk cage restraint screw and keep in a safe place.

10 Place the advanced function tray chassis on a flat, static-free surface.

11 Place your fingers under the tab located at the bottom rear of the hard disk cage. Lift firmly on the tab. At the same time, slide the hard disk cage in the direction shown in Figure 106 until the unit detaches from the mounting points on the AFT chassis.

**Figure 106** Detach the hard disk cage from the BCM400 advanced function tray chassis




12 Remove the hard disk cage from the BCM400 advanced function tray chassis. Place the hard disk cage on a flat, clean and static-free surface.

13 This procedure is complete.

# Install a Hard Disk Cage

Use the procedures in this section to install a standard or RAID configuration hard disk cage into a BCM200 or BCM400 system. Install the hard disk cage in the BCM after RAID upgrade, hard disk or RAID card replacement conditions.

This section describes the following procedures:


- "Install a hard disk cage in a BCM200 platform base chassis" on page 225
- "Install a hard disk cage in a BCM400 platform base chassis" on page 227


**Warning:** You must initialize the Business Communications Manager system when you install a new hard disk on a single-disk system (see "Initialize the Hard Disk" on page 236).

## Install a hard disk cage in a BCM200 platform base chassis

Use this procedure to install the standard or RAID configuration hard disk cage into the BCM200 platform base chassis.

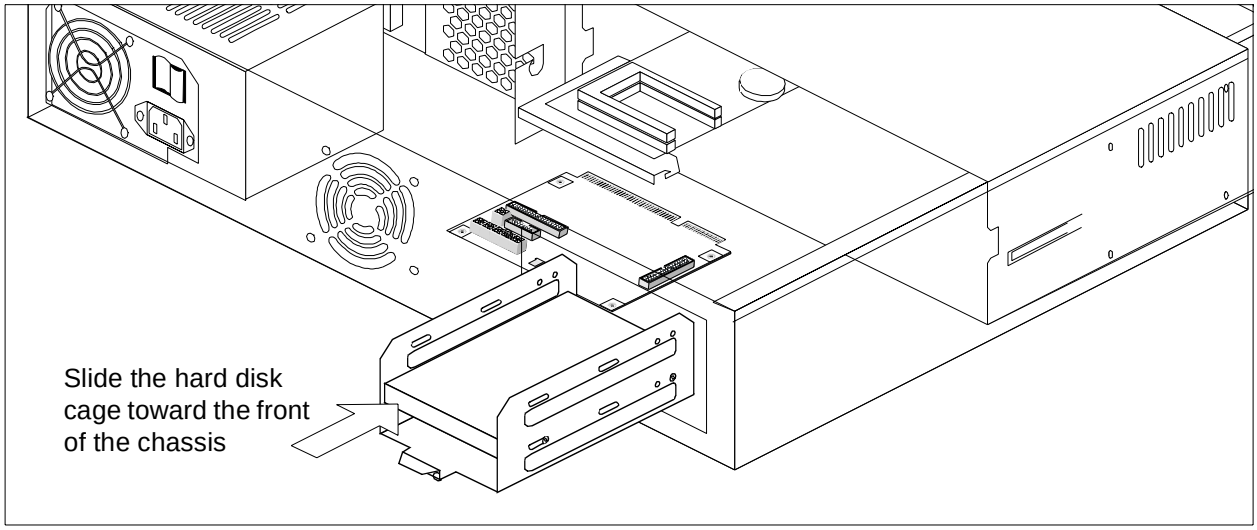
**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

1. Disconnect the Business Communications Manager from the AC power outlet.
2. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface on the BCM platform base chassis.
3. If accessible, remove the platform base chassis top cover (see "Remove the platform base chassis top cover" on page 211). Continue to the next step of this procedure when complete.
4. You can access the hard disk location from a panel at the rear of the platform base chassis. Remove the four hard disk access panel screws (see Figure 105). Place the panel and screws in a safe location.
5. Install the hard disk cage in the BCM200 platform base chassis.
   a. Insert the hard disk cage through the hard disk access panel in the back of the BCM200.
   b. Position the hard disk cage in front of the cage chassis mounting points. The hard disk cage lift tab is at the rear of the hard disk cage.
   c. Slide the hard disk cage in the direction shown in Figure 107 until the unit attaches to the chassis. You will hear a snap as the hard disk cage locking tab slips into position.
6. Reconnect power and IDE cables to the hard disk. Connect the hard disk to the system:
   a. Connect the IDE ribbon cable connector to the hard disk (or RAID card) IDE interface.

**b** Connect the power supply to the hard disk(s).

**Note:** All connectors have a notch that allow you to align the connectors correctly. If you cannot push a connector in easily, do not force it. Examine the connector before attempting to install the cable to determine the correct orientation.

**Figure 107** Insert the hard disk cage into the BCM200 platform base chassis




**7** Replace the cover (if applicable) and access panel.

**8** Restore the Business Communications Manager to operation. Refer to “Restart the System after Maintenance” on page 197. Continue to the next step of this procedure when complete.

**9** If you installed a new, programmed hard disk in a standard configuration (for RAID configuration, skip to the next step):

**a** Initialize the hard disk. Refer to “Initialize the Hard Disk” on page 236.

**b** After the disk is initialized, restore your data from your backups. If you did not backup your keycodes, re-enter them (see “Enter the software keycodes” on page 191).

**10** If you installed a new, blank hard disk (mirror or primary) in a RAID, wait for the disk mirror process to complete. For further information on how to monitor disk mirroring progress, refer to “RAID Disk Mirroring” on page 378. Continue to the next step of this procedure when complete.

**11** This procedure is complete.

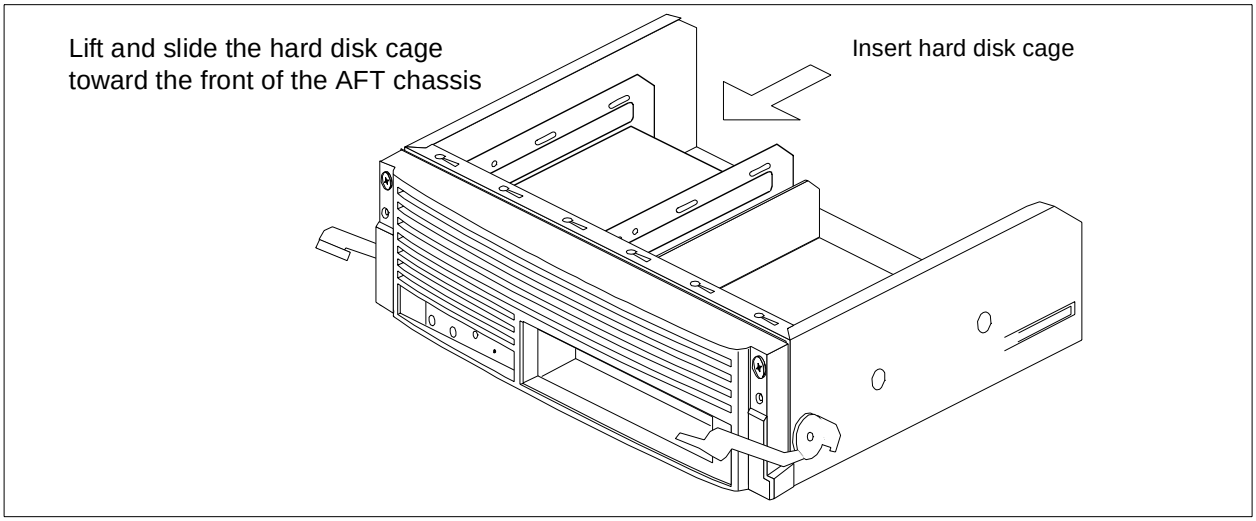
## Install a hard disk cage in a BCM400 platform base chassis

Use this procedure to install the standard or RAID configuration hard disk cage into the BCM400 platform advanced function tray.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

1. Disconnect the Business Communications Manager from the AC power source.
2. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
3. Install the hard disk(s) in the hard disk cage (see "Install a hard disk into a standard configuration hard disk cage" on page 232 or "Install a primary hard disk into a RAID hard disk cage" on page 233 or "Install a mirror hard disk into a RAID hard disk cage" on page 234). Continue to the next step in this procedure when complete.
4. Position the hard disk cage in front of the cage chassis mounting points in the advanced function tray. The hard disk cage lift tab is at the rear of the hard disk cage. If you are installing a RAID, the LEDs point to the front of the AFT.
5. Slide the hard disk cage in the direction shown in Figure 108 until the unit engages with the chassis mounting points in the advanced function tray.

**Figure 108** Insert the hard disk cage to the BCM400 advanced function tray chassis




6. Partially insert the advanced function tray into the BCM400 platform base chassis. Ensure you do not pinch any cables against the chassis or internal components.
7. Connect the hard disk (or RAID) to the system:
   a. Connect the hard disk (or RAID card) to the IDE ribbon cable.

**b** Connect the power supply to the hard disk(s).

**Note:** All connectors have a notch that allow you to align the connectors correctly. If you cannot push a connector in easily, do not force it. Examine the connector before attempting to install the cable to determine the correct orientation.

8 Slide the advanced function tray completely into the BCM400 platform base chassis (see "Install the advanced function tray" on page 209). Continue to the next step of this procedure when complete.

9 Restore the Business Communications Manager to operation. Refer to "Restart the System after Maintenance" on page 197. Continue to the next step of this procedure when complete.

10 If you installed a new, programmed hard disk in a standard configuration (for RAID configuration, skip to the next step):

**a** Initialize the hard disk. Refer to "Initialize the Hard Disk" on page 236.

**b** After the disk is initialized, restore your data from your backups. If you did not backup your keycodes, re-enter them (see "Enter the software keycodes" on page 191).

11 If you installed a new, blank hard disk (mirror or primary) in a RAID, wait for the disk mirror process to complete. For further information on how to monitor disk mirroring progress, refer to "RAID Disk Mirroring" on page 378. Continue to the next step of this procedure when complete.

12 This procedure is complete.

## Replace a Hard Disk in the Hard Disk Cage

Use the procedures in this section to remove or install the hard disk in the hard disk cage for the standard and RAID upgrade BCM200 and BCM400 configurations.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

Refer to the following detailed information:

- "Remove a hard disk from a standard configuration hard disk cage" on page 229
- "Remove a primary hard disk from a RAID hard disk cage" on page 230
- "Remove a mirror hard disk from a RAID hard disk cage" on page 231
- "Install a hard disk into a standard configuration hard disk cage" on page 232
- "Install a primary hard disk into a RAID hard disk cage" on page 233
- "Install a mirror hard disk into a RAID hard disk cage" on page 234

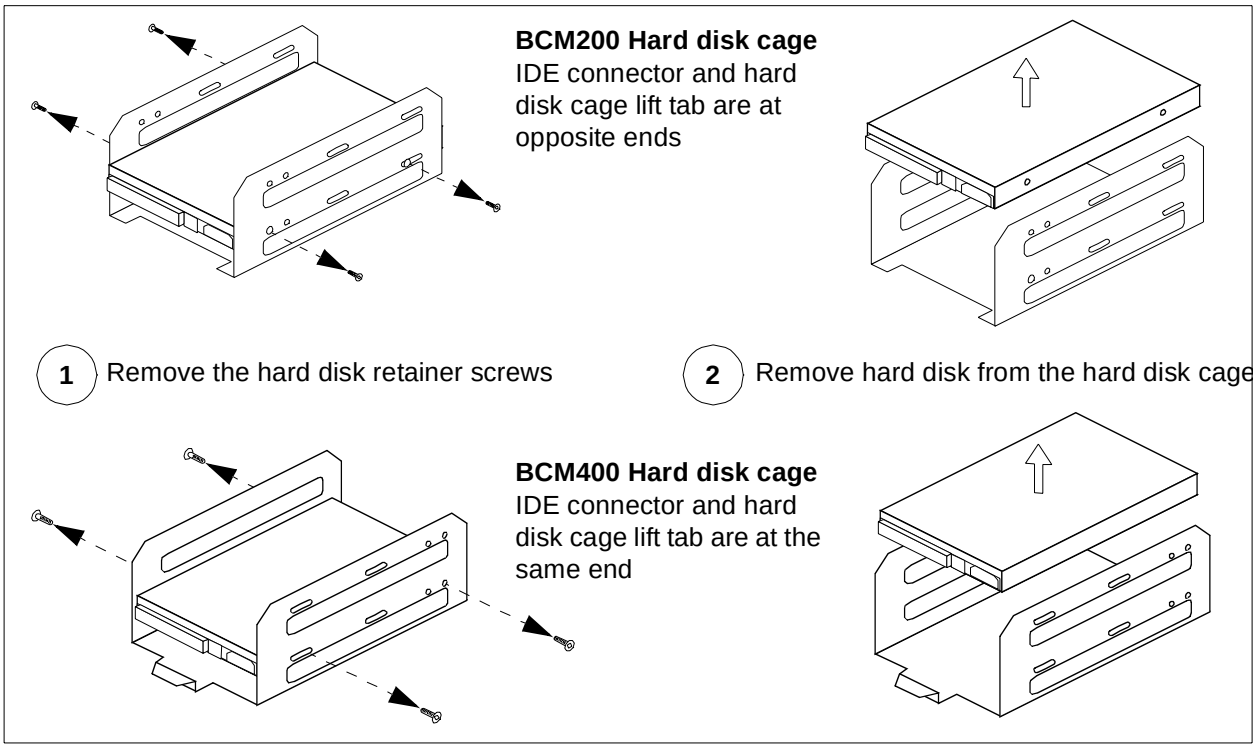
## Remove a hard disk from a standard configuration hard disk cage

Use this procedure to remove the hard disk from the hard disk cage for the standard BCM200 and BCM400 configurations. Use this procedure only to replace a faulty hard disk.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

1. Remove the standard hard disk cage from the platform base (or AFT) chassis (see "Remove a Hard Disk Cage" on page 221). Continue to the next step in this procedure when complete.
2. Unscrew the hard disk retainer screws from both sides of the standard hard disk cage (see Figure 109). Place the retainer screws in a safe location.
3. Remove the hard disk from the standard hard disk cage (see Figure 109).
4. Place the hard disk on a flat, clean and static-free surface.

**Figure 109** Remove the hard disk from the standard hard disk cage


BCM200 Hard disk cage
IDE connector and hard disk cage lift tab are at opposite ends
1 Remove the hard disk retainer screws
2 Remove hard disk from the hard disk cage
BCM400 Hard disk cage
IDE connector and hard disk cage lift tab are at the same end

5. This procedure is complete.

## Remove a primary hard disk from a RAID hard disk cage

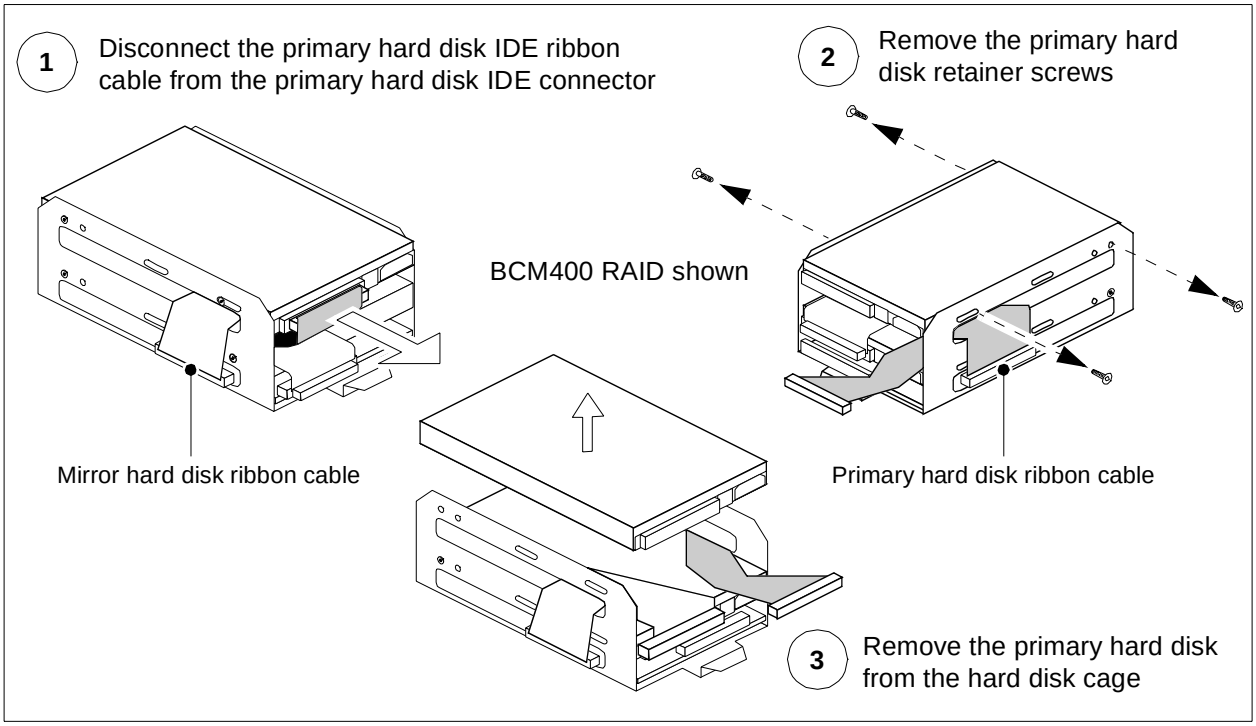
Use this procedure to remove the primary hard disk from the RAID hard disk cage for the BCM200 and BCM400 configurations. Use this procedure if you need to replace a faulty hard disk. If a primary hard disk fails, the mirror hard disk assumes control and service remains uninterrupted.

Nortel networks recommends you replace the failed primary hard disk to retain full redundancy. Replace the failed primary hard disk during a period of low call traffic.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

1. Remove the RAID hard disk cage from the platform base (or AFT) chassis (see "Remove a Hard Disk Cage" on page 221). Continue to the next step in this procedure when complete.
2. Disconnect the hard disk IDE connector from the primary hard disk.
3. Unscrew the hard disk retainer screws from both sides of the RAID hard disk cage (see Figure 110). Place the retainer screws in a safe location.
4. Remove the primary hard disk from the RAID hard disk cage (see Figure 110).

**Figure 110** Remove the primary hard disk from the RAID hard disk cage


1
Disconnect the primary hard disk IDE ribbon cable from the primary hard disk IDE connector
2
Remove the primary hard disk retainer screws
BCM400 RAID shown
Mirror hard disk ribbon cable
Primary hard disk ribbon cable
3
Remove the primary hard disk from the hard disk cage

5. Place the primary hard disk on a flat, clean and static-free surface.
6. This procedure is complete.

## Remove a mirror hard disk from a RAID hard disk cage

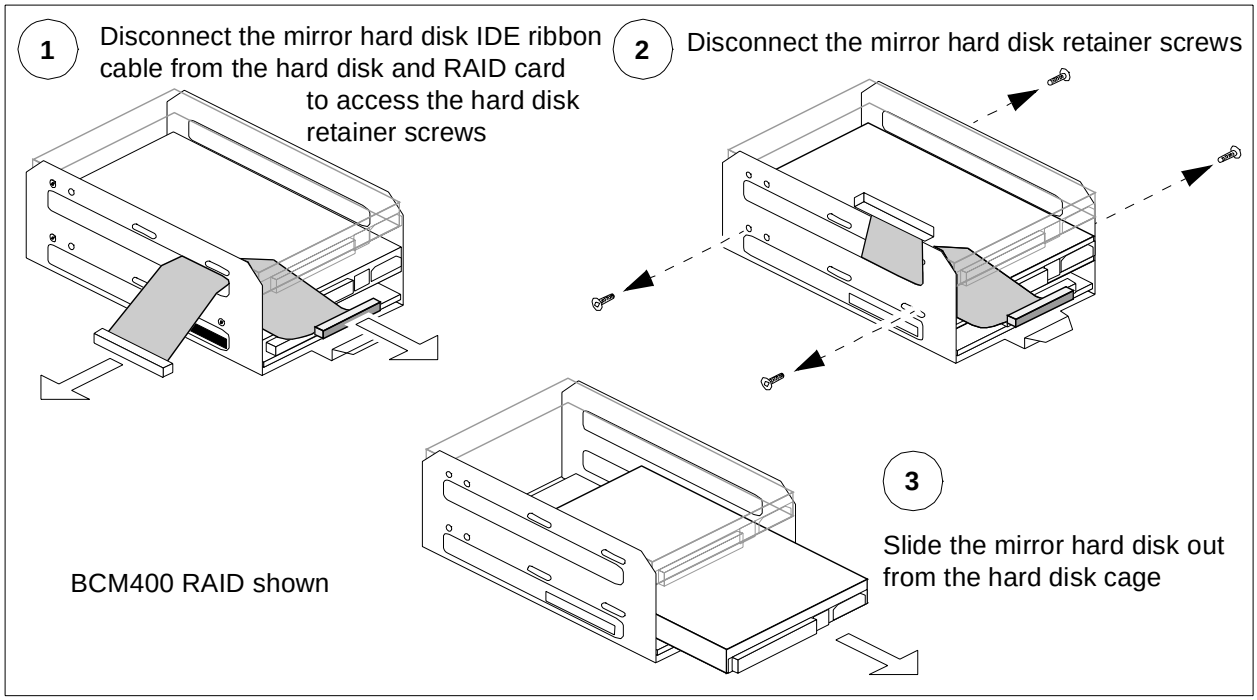
Use this procedure to remove the mirror hard disk from the RAID hard disk cage for the BCM200 and BCM400 configurations. Use this procedure if you need to replace a faulty mirror hard disk.

Nortel networks recommends you replace the failed mirror hard disk to retain full redundancy. Replace the failed mirror hard disk during a period of low call traffic. If you choose to remove both the primary and mirror hard disks from the hard disk cage, place an identifying mark on the primary hard disk to ensure correct installation.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

1. Remove the RAID hard disk cage from the platform base (or AFT) chassis (see "Remove a Hard Disk Cage" on page 221). Continue to the next step in this procedure when complete.
2. Disconnect the hard disk IDE connectors from the mirror hard disk and RAID card.
3. Unscrew the hard disk retainer screws from both sides of the RAID hard disk cage (see Figure 111). Lift the mirror hard disk IDE ribbon cable to access the retainer screw. Place the retainer screws in a safe location.
4. Remove the mirror hard disk from the RAID hard disk cage (see Figure 111).

**Figure 111** Remove the mirror hard disk from the RAID hard disk cage


1
Disconnect the mirror hard disk IDE ribbon cable from the hard disk and RAID card to access the hard disk retainer screws
2
Disconnect the mirror hard disk retainer screws
3
Slide the mirror hard disk out from the hard disk cage
BCM400 RAID shown

5. Place the hard disk on a flat, clean and static-free surface.
6. This procedure is complete.

## Install a hard disk into a standard configuration hard disk cage

Use this procedure to install a single hard disk into a hard disk cage for a standard BCM200 or BCM400 configuration.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

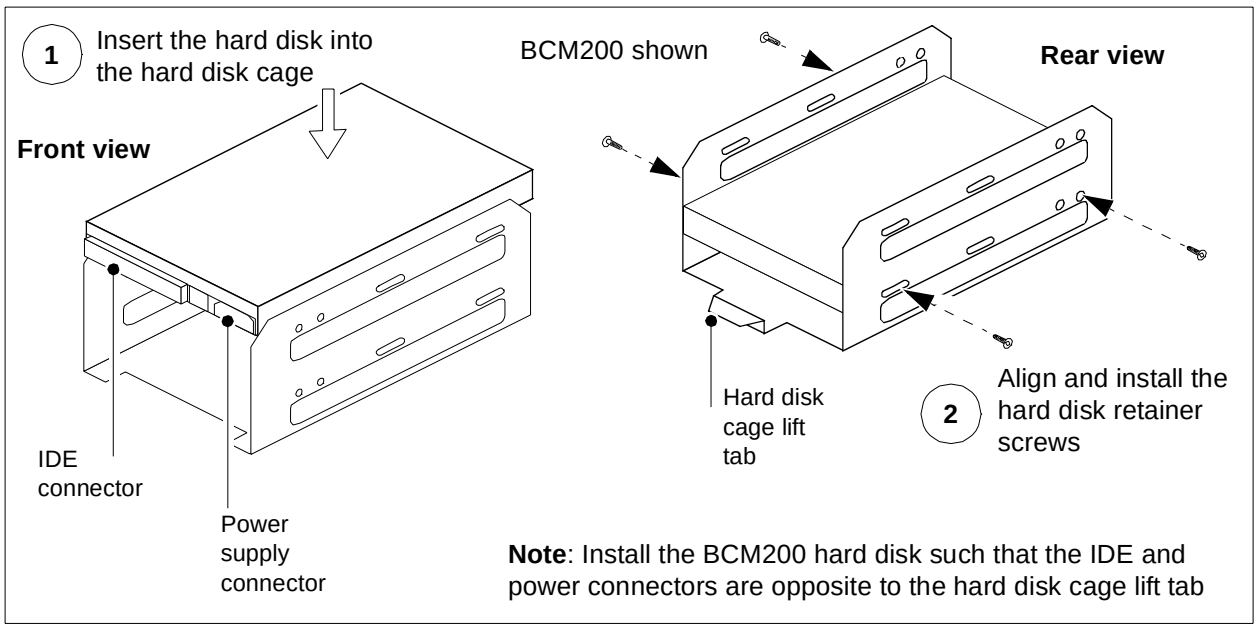
1 Position the hard disk into the bottom position of the hard disk cage.

**Note:** For a BCM200 platform, orient the hard disk such that the power and IDE connectors are on the bottom and opposite to the hard disk cage lift tab (see Figure 112).

For a BCM400 platform, orient the hard disk such that the power and IDE connectors are on the bottom and on the same side as the hard disk cage lift tab.

2 Align the hard disk and hard disk cage retaining screw holes. Fasten the hard disk cage retainer screws into both sides of the hard disk cage (see Figure 112).

**Figure 112** Install a single hard disk in the standard configuration hard disk cage


1
Insert the hard disk into the hard disk cage
Front view
IDE connector
Power supply connector
BCM200 shown
Rear view
Hard disk cage lift tab
2
Align and install the hard disk retainer screws
Note: Install the BCM200 hard disk such that the IDE and power connectors are opposite to the hard disk cage lift tab

3 This procedure is complete.

## Install a primary hard disk into a RAID hard disk cage

Use this procedure to install a primary hard disk into the RAID hard disk cage for the BCM200 or BCM400 systems. Use this procedure if you need to replace a faulty primary hard disk or install a programmed hard disk from a standard configuration.

Nortel networks recommends you replace a failed primary hard disk to retain full redundancy. Replace the failed primary hard disk during a period of low call traffic.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

**Note:** For a RAID upgrade kit, the mirror disk and primary disk IDE ribbon cables are pre-installed. If applicable, install the programmed hard disk from your single disk system into the RAID hard disk cage (use as the primary disk - see Figure 114).

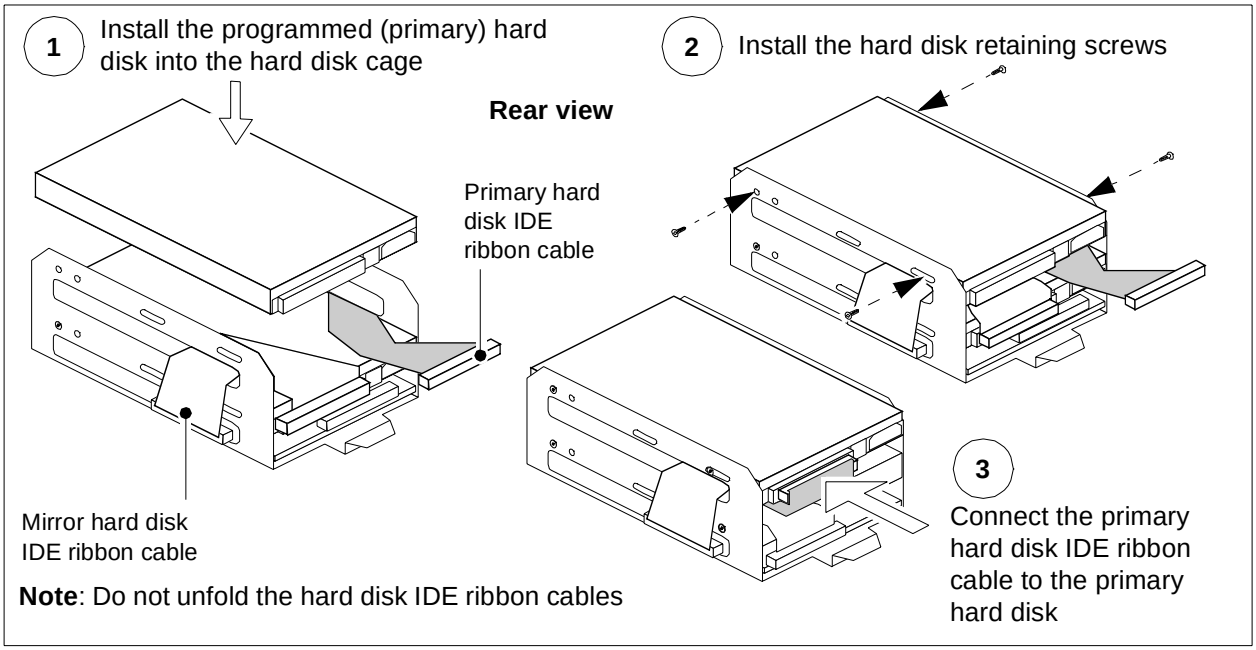
**Note:** For a BCM200 platform, orient the hard disk such that the power and IDE connectors are on the bottom and opposite to the hard disk cage lift tab (see Figure 112).

For a BCM400 platform, orient the hard disk such that the power and IDE connectors are on the bottom and on the same side as the hard disk cage lift tab (see Figure 113).

**Note:** The hard disk storage capacity (in MB) for both primary and mirror hard disks must be identical. Equipment provided by Nortel Networks assures correct hard disk capacity requirements.

1. Position the primary hard disk into the top position of the RAID hard disk cage.
2. Align the hard disk and hard disk cage retaining screw holes. Fasten the hard disk cage retainer screws into both sides of the hard disk cage (see Figure 113).
3. Connect the correct primary IDE ribbon cable connector to the primary hard disk.

**Figure 113** Install a primary hard disk into the RAID hard disk cage


1
Install the programmed (primary) hard disk into the hard disk cage
2
Install the hard disk retaining screws
Rear view
Primary hard disk IDE ribbon cable
Mirror hard disk IDE ribbon cable
Note: Do not unfold the hard disk IDE ribbon cables
3
Connect the primary hard disk IDE ribbon cable to the primary hard disk

4 This procedure is complete.

## Install a mirror hard disk into a RAID hard disk cage

Use this procedure to install the mirror hard disk into the RAID hard disk cage for the BCM200 and BCM400. Use this procedure if you need to replace a faulty mirror hard disk.

Nortel networks recommends you replace a failed mirror hard disk to retain full redundancy. Replace the failed mirror hard disk during a period of low call traffic. If you choose to remove both the primary and mirror hard disks from the hard disk cage, place an identifying mark on the primary hard disk to ensure correct installation.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

**Note:** For a RAID upgrade kit, the mirror disk and primary disk IDE ribbon cables are pre-installed. If applicable, install the programmed hard disk from your single disk system into the RAID hard disk cage (use as the primary disk - see Figure 113).

**Note:** For a BCM200 platform, orient the hard disk such that the power and IDE connectors are on the bottom and opposite to the hard disk cage lift tab (see Figure 112).

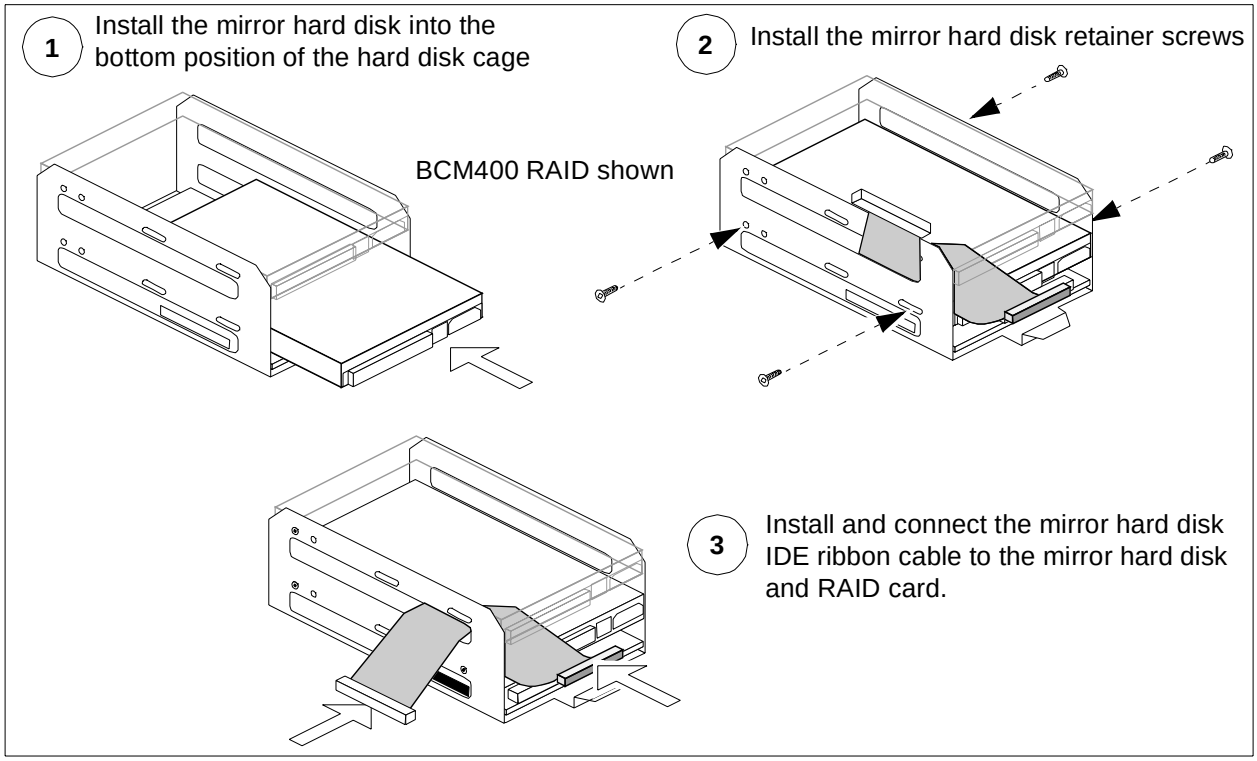
For a BCM400 platform, orient the hard disk such that the power and IDE connectors are on the bottom and on the same side as the hard disk cage lift tab (see Figure 114).

**Note:** The hard disk storage capacity (in MB) for both hard disks must be identical. Equipment provided by Nortel Networks assures correct hard disk capacity requirements.

1 Install the mirror hard disk into the bottom position of the RAID hard disk cage.

2 Align the hard disk and hard disk cage retaining screw holes. Fasten the hard disk cage retainer screws into both sides of the hard disk cage (see Figure 114).

**Figure 114** Install a mirror hard disk into the RAID hard disk cage


1
Install the mirror hard disk into the bottom position of the hard disk cage
BCM400 RAID shown
2
Install the mirror hard disk retainer screws
3
Install and connect the mirror hard disk IDE ribbon cable to the mirror hard disk and RAID card.

3 Install and connect the mirror hard disk IDE ribbon cable to the mirror hard disk and RAID card. Retain the folds in the mirror hard disk IDE ribbon cable. Ensure you connect the mirror hard disk to the correct RAID IDE connector.

4 If you removed the primary disk, see "Install a primary hard disk into a RAID hard disk cage" on page 233. Install and connect the primary hard disk IDE ribbon cable to the RAID card. Retain the folds in the primary hard disk IDE ribbon cable. Ensure you connect the primary hard disk to the correct RAID IDE connector.

**Caution:** It is vital that you connect the correct IDE ribbon cables to the correct hard disk(s). Connect the primary ribbon cable to the primary hard disk. Connect the mirror ribbon cable to the mirror hard disk

5 This procedure is complete.

# Initialize the Hard Disk

The Business Communications Manager system is normally initialized prior to shipment. However, if you have to replace the hard drive in a standard, single-disk Business Communications Manager, use this procedure to initialize the Business Communications Manager software. For further information on how to replace a hard disk in a standard configuration, refer to "Replace a Hard Disk in the Hard Disk Cage" on page 228. For further information on how to monitor disk activity, refer to Chapter 15, "System Monitoring and Troubleshooting".

After initialization, you must restore the configuration data to the Business Communications Manager. Use the Backup and Restore Utility (BRU) to restore configuration data (see "Use the Backup and Restore Utility"). Nortel Networks recommends you maintain a current configuration backup. If you do not have a current backup, enter the configuration data manually.

**Note:** When you replace a hard disk, IP configuration data is lost. The Business Communications Manager IP address defaults to: 10.10.10.1

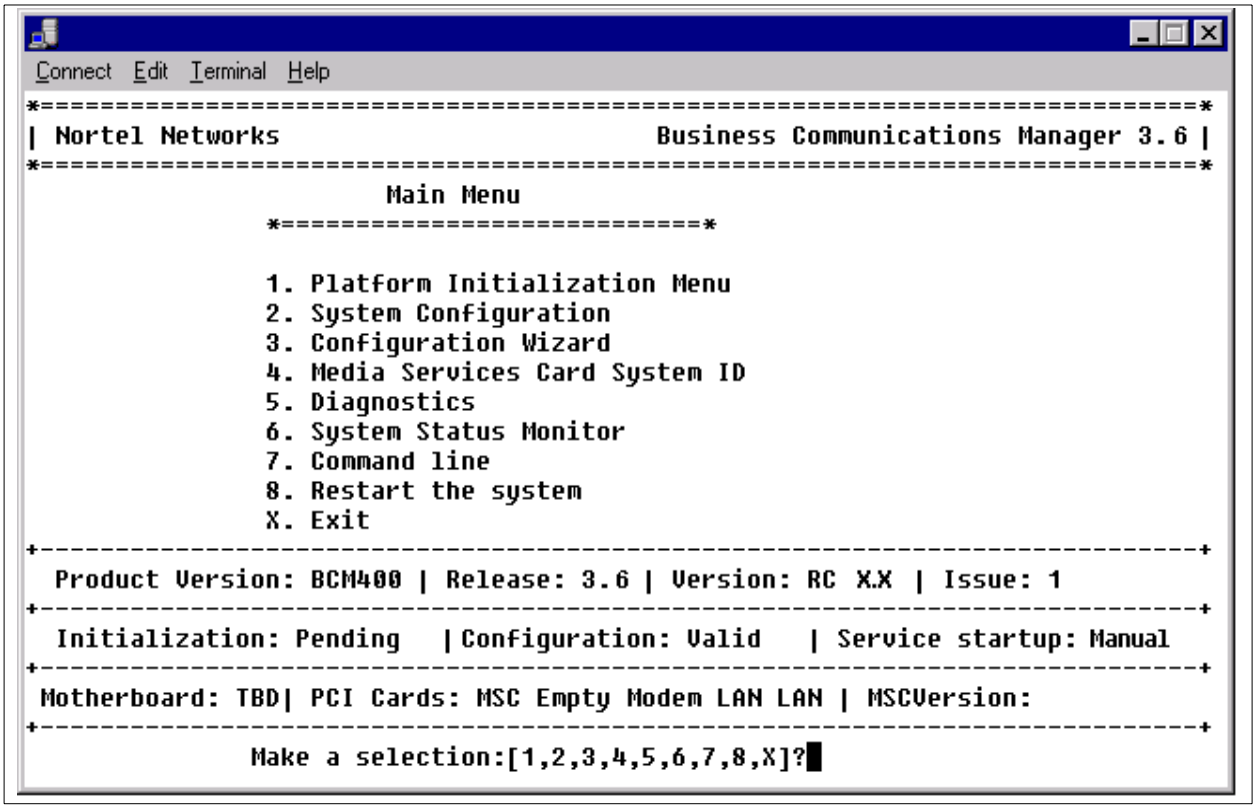
Perform the following procedures after you replace the hard disk and the system has booted up:

1. Ensure the **Power** (LED 1), **Temp** (LED 9) and **Fan** (LED 10) on the Business Communications Manager are lit.
2. Access the Business Communications Manager using one of the following methods:
   - **a** If using a terminal emulation program (Hyperterm), attach a configuration computer to the base function tray serial port (recommended method). Continue to the next step in this procedure when complete.
   - **b** If you are accessing the Business Communications Manager through your local area network through SSH, use the default IP address 10.10.10.1 (see note). Continue to the next step in this procedure when complete. For further information on how to access the system through SSH, refer to the *Management User Guide*.

**Note:** If another network terminal uses default IP address 10.10.10.1, conflicts and network problems can occur. Nortel Networks recommends that you either disconnect the terminal before proceeding with method (b) or use method (a) described in this step.

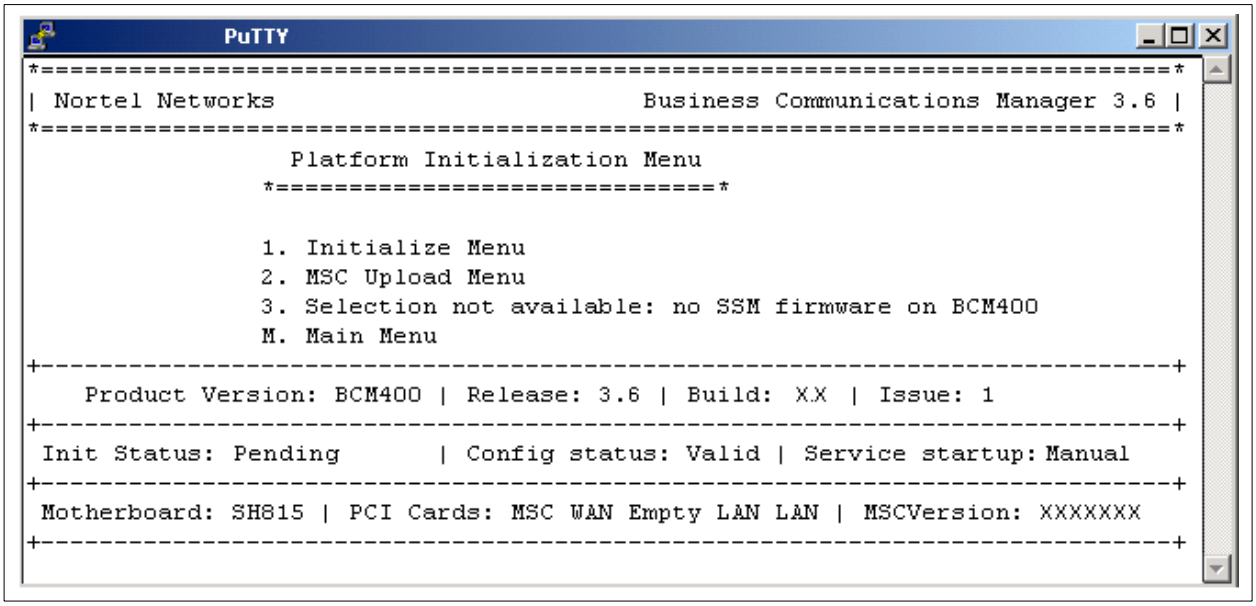
3. Log onto the Business Communications Manager as described in "Display the configuration menus" on page 188. The system displays the main menu (see Figure 115). Continue to the next step in this procedure when complete.

**Figure 115** Main menu


Connect Edit Terminal Help
| Nortel Networks Business Communications Manager 3.6 |
Main Menu
1. Platform Initialization Menu
2. System Configuration
3. Configuration Wizard
4. Media Services Card System ID
5. Diagnostics
6. System Status Monitor
7. Command line
8. Restart the system
X. Exit
Product Version: BCM400 | Release: 3.6 | Version: RC X.X | Issue: 1
Initialization: Pending | Configuration: Valid | Service startup: Manual
Motherboard: TBD| PCI Cards: MSC Empty Modem LAN LAN | MSCVersion:
Make a selection:[1,2,3,4,5,6,7,8,X]?

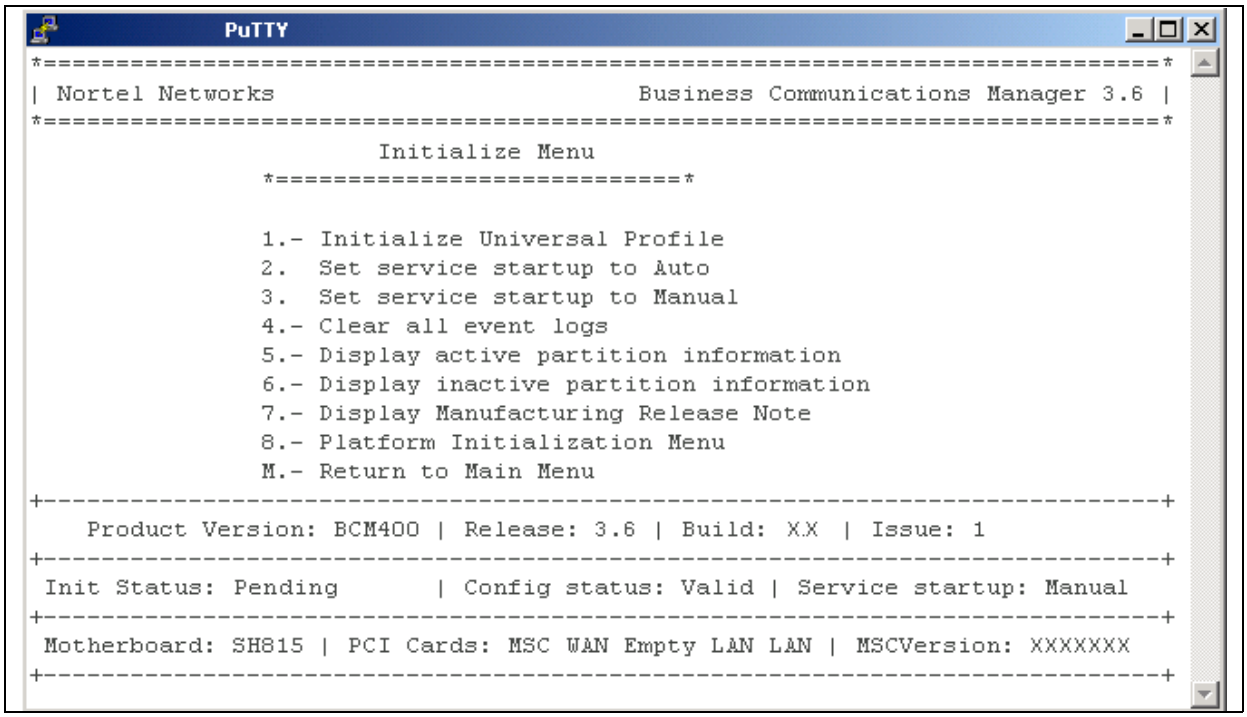
**4** Select option 1 - Platform Initialization Menu. The Platform Initialization menu screen appears (see Figure 116).

**Figure 116** Platform initialization menu


PuTTY
| Nortel Networks Business Communications Manager 3.6 |
Platform Initialization Menu
1. Initialize Menu
2. MSC Upload Menu
3. Selection not available: no SSM firmware on BCM400
M. Main Menu
Product Version: BCM400 | Release: 3.6 | Build: X.X | Issue: 1
Init Status: Pending | Config status: Valid | Service startup: Manual
Motherboard: SH815 | PCI Cards: MSC WAN Empty LAN LAN | MSCVersion: XXXXXXX

**5** Select option 1 - Initialize Menu. The Initialize menu screen appears (see Figure 117).

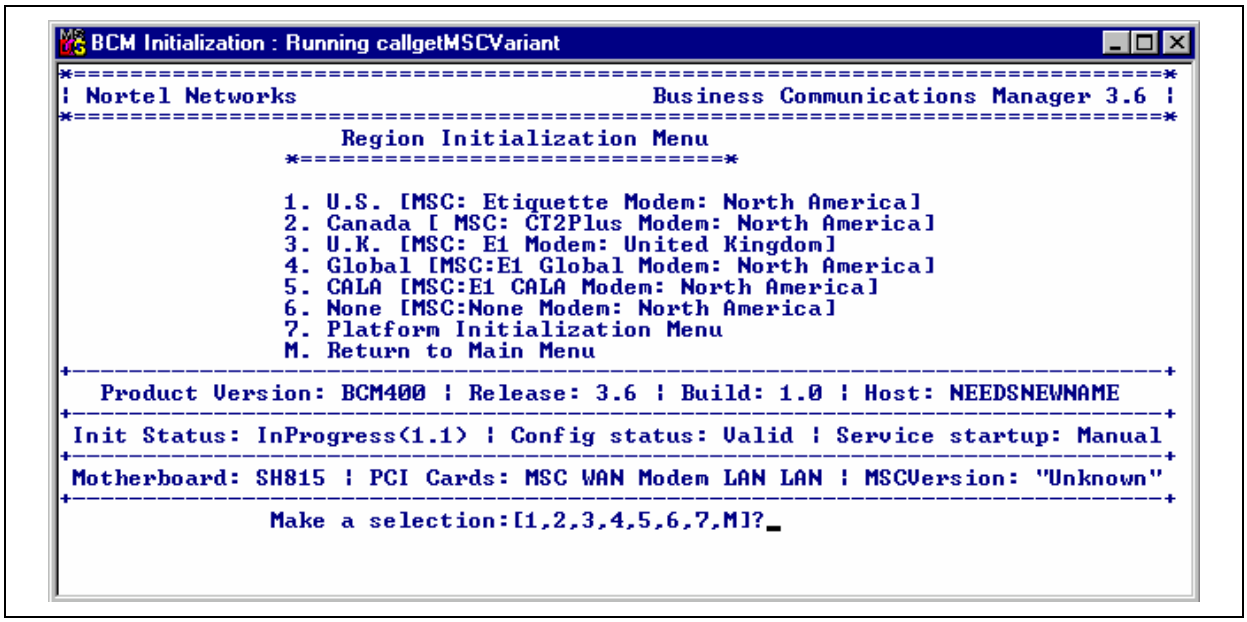
**Figure 117** Initialize Menu screen


PuTTY
| Nortel Networks Business Communications Manager 3.6 |
Initialize Menu
1.- Initialize Universal Profile
2. Set service startup to Auto
3. Set service startup to Manual
4.- Clear all event logs
5.- Display active partition information
6.- Display inactive partition information
7.- Display Manufacturing Release Note
8.- Platform Initialization Menu
M.- Return to Main Menu
Product Version: BCM400 | Release: 3.6 | Build: X.X | Issue: 1
Init Status: Pending | Config status: Valid | Service startup: Manual
Motherboard: SH815 | PCI Cards: MSC WAN Empty LAN LAN | MSCVersion: XXXXXXX

6 Select option 1: “Initialize Universal Profile” from the Initialize Menu (see Figure 117). The system executes the initialization process.

**Note:** If the initialization process detects a core software load mismatch between the MSC and the hard disk, the system displays a menu screen that prompts you to enter the most appropriate core load (see Figure 118 on page 239). The load on the MSC is the most recent load (if you replaced the hard disk). Select menu option 6 “Do not select any load” to by-pass the core upload and continue with the initialization process.

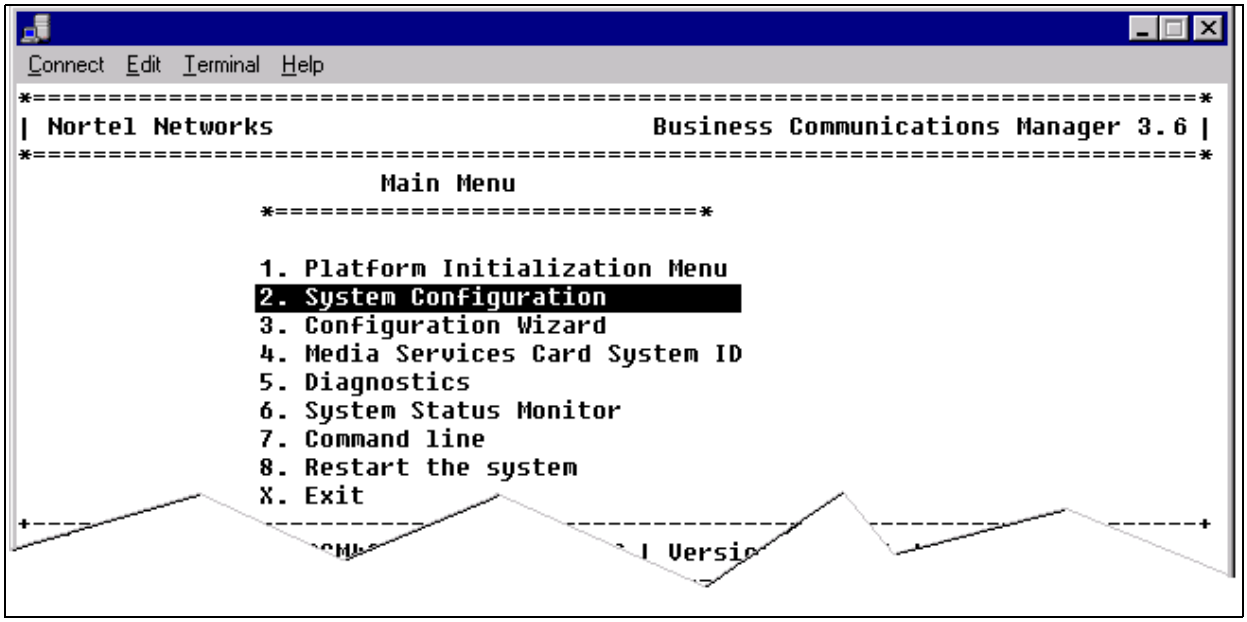
**Figure 118** Region Initialization Menu


BCM Initialization : Running callgetMSCVariant
Nortel Networks
Business Communications Manager 3.6
Region Initialization Menu
1. U.S. [MSC: Etiquette Modem: North America]
2. Canada [ MSC: CT2Plus Modem: North America]
3. U.K. [MSC: E1 Modem: United Kingdom]
4. Global [MSC:E1 Global Modem: North America]
5. CALA [MSC:E1 CALA Modem: North America]
6. None [MSC:None Modem: North America]
7. Platform Initialization Menu
M. Return to Main Menu
Product Version: BCM400 | Release: 3.6 | Build: 1.0 | Host: NEEDSNEWNAME
Init Status: InProgress(1.1) | Config status: Valid | Service startup: Manual
Motherboard: SH815 | PCI Cards: MSC WAN Modem LAN LAN | MSCVersion: "Unknown"
Make a selection:[1,2,3,4,5,6,7,M]?

The initialization process is automatic and takes several minutes to complete. The system automatically reboots a number of times as part of the initialization process. For each reboot, the session disconnects. When the initialization process is complete, re-establish your connection to the Business Communications Manager using one of the connection methods described in Step 2 of this procedure.

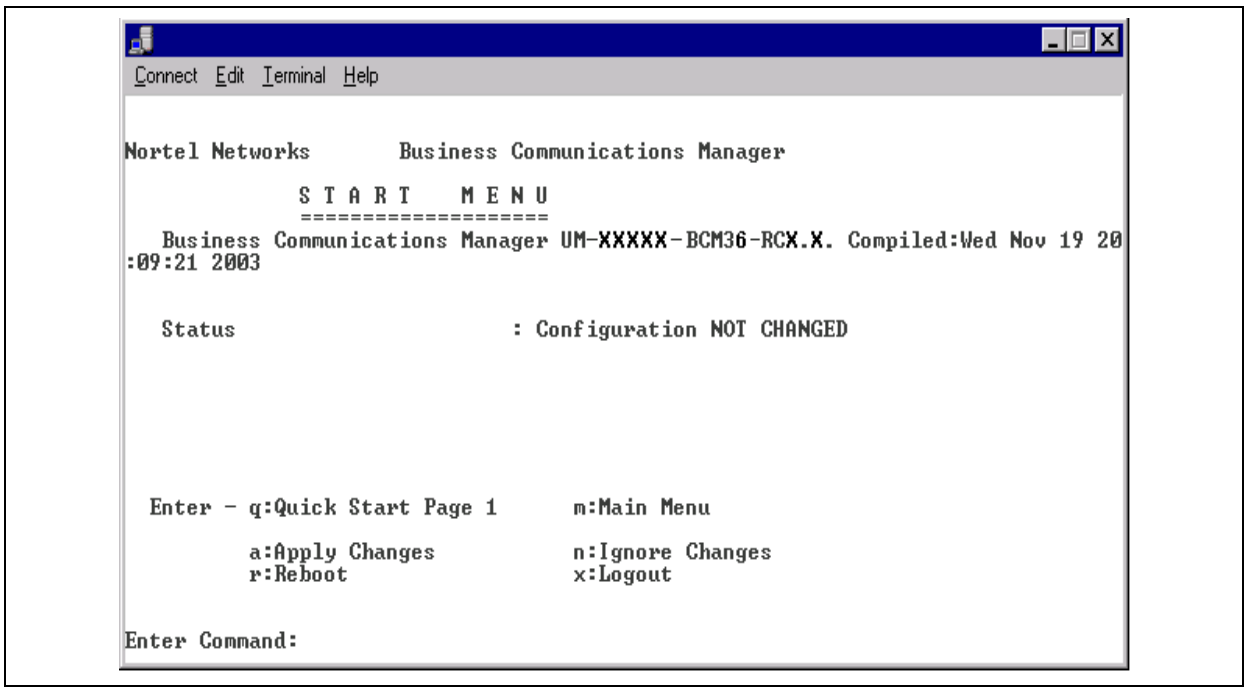
**7** Select option 2: “System Configuration” from the Main Menu (see Figure 119 on page 239) This option provides access to the command interpreter level of the Unified Manager to program the network interfaces.

**Figure 119** Select option 2 - Main menu screen



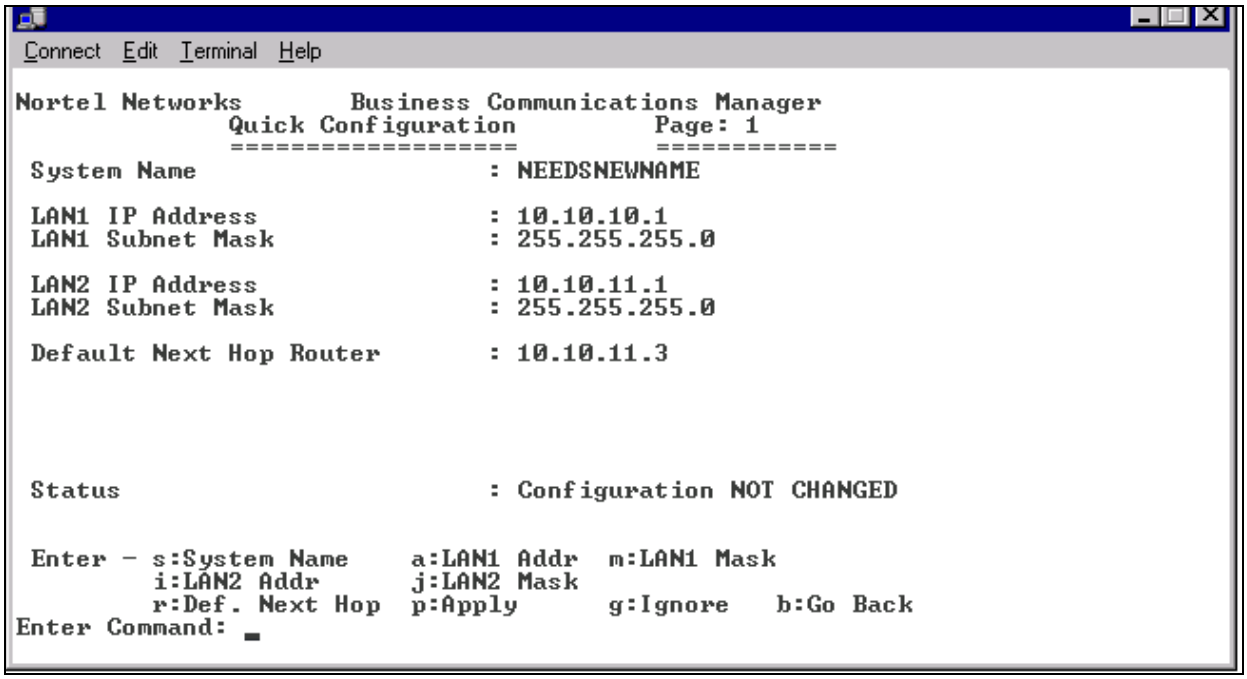
8 Enter the default login UserID and password at System Configuration login prompt (from the command interpreter level of the Unified Manager). The System Configuration Start Page screen appears (see Figure 120).

**Figure 120** System configuration start page


Connect Edit Terminal Help
Nortel Networks Business Communications Manager
S T A R T M E N U
Business Communications Manager UM-XXXXX-BCM36-RCX.X. Compiled:Wed Nov 19 20
:09:21 2003
Status : Configuration NOT CHANGED
Enter - q:Quick Start Page 1 m:Main Menu
a:Apply Changes n:Ignore Changes
r:Reboot x:Logout
Enter Command:

9 Access the Quick Start page (type "**q**"). The Quick Start Page screen appears (see Figure 121 on page 240).

**Figure 121** Quick start page


Connect Edit Terminal Help
Nortel Networks Business Communications Manager
Quick Configuration Page: 1
System Name : NEEDSNEWNAME
LAN1 IP Address : 10.10.10.1
LAN1 Subnet Mask : 255.255.255.0
LAN2 IP Address : 10.10.11.1
LAN2 Subnet Mask : 255.255.255.0
Default Next Hop Router : 10.10.11.3
Status : Configuration NOT CHANGED
Enter - s:System Name a:LAN1 Addr m:LAN1 Mask
i:LAN2 Addr j:LAN2 Mask
r:Def. Next Hop p:Apply g:Ignore b:Go Back
Enter Command:

**10** Enter the correct network IP addresses for LAN1, LAN2, Subnet masks, Next hop router and System name from the Quick start page as required. Select the appropriate menu options shown at the bottom of the screen. After each change, select "**p**" (apply).

**11** Select "**b**" (go back) to return to the System Configuration Start Page screen after all network IP addresses are configured (see Figure 120 on page 240).

**12** Reboot the system to apply the network IP address changes. At the System Configuration start page, type "**r**" (reboot).

**Note:** If you need to install an SRG (survivable remote gateway), apply the SRG key code. Refer to the *SRG Configuration Guide* for details on how to configure the SRG.

**13** Reapply any software patches. For core patches, apply only the latest versions.

**14** Do one of the following:

- Manually re-enter configuration data.
- Restore system and data information (except Telephony, Registry and DECT) from your backup data. For information on how to restore data to your system from a backup, see "Use the Backup and Restore Utility" on page 215. Continue to the next step in this procedure when complete.

**Note:** Perform a backup only on similar software versions.

**15** This procedure is complete.

# Chapter 8
# Install or Replace a Cooling Fan

This chapter describes how to replace a cooling fan in the BCM200 and BCM400 platform base chassis. This chapter also describes how to add a second fan the BCM400 platform base chassis (available through the field redundancy upgrade kit).

This chapter contains the following primary topics:


- "Cooling Fan Replacement Process" on page 244
- "Troubleshooting Fans" on page 256


**Note:** For the BCM400 RFO factory configuration, a redundant cooling fan and power supply is included.

**Warning:** You must remove all of the connections to the Business Communications Manager before you power the system down.

Failure to disconnect lines before power down can cause damage to the system.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

# Cooling Fan Replacement Process

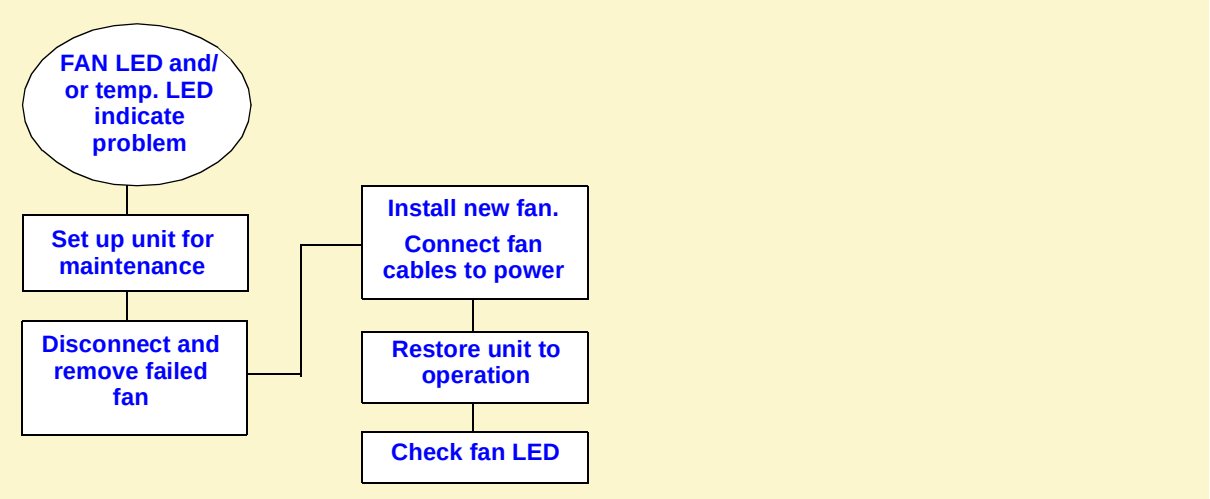
This section contains procedures to replace the cooling fan in the BCM400, BCM200 and expansion unit platform base chassis. This section contains the following topics:


- "Remove a BCM400 cooling fan" on page 244
- "Install a BCM400 cooling fan" on page 247
- "Remove a BCM200 cooling fan" on page 249
- "Install the BCM200 cooling fan" on page 251
- "Remove an expansion unit fan" on page 252
- "Install an expansion unit fan" on page 254


Cooling fans circulate air through the chassis of the Business Communications Manager and expansion unit to prevent the components from overheating.

Figure 122 provides an overview of the fan replacement process.

**Figure 122** Chassis cooling fan replacement overview


FAN LED and/ or temp. LED indicate problem
Set up unit for maintenance
Disconnect and remove failed fan
Install new fan.
Connect fan cables to power
Restore unit to operation
Check fan LED

## Remove a BCM400 cooling fan

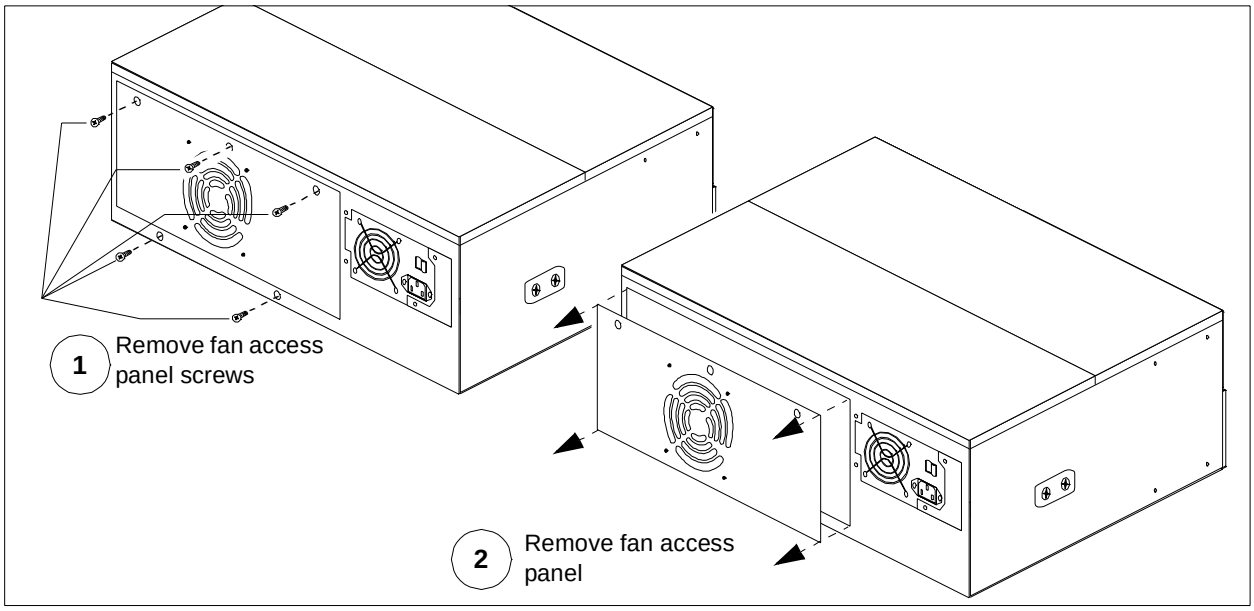
Use this procedure to remove the cooling fan(s) in a BCM400 standard or redundant feature option (RFO) platform configuration. The standard Business Communications Manager has one fan. The BCM400 RFO version has two fans.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

Before you shut down the system, determine if a fan (in the redundant version) has failed. Refer to Table 49.

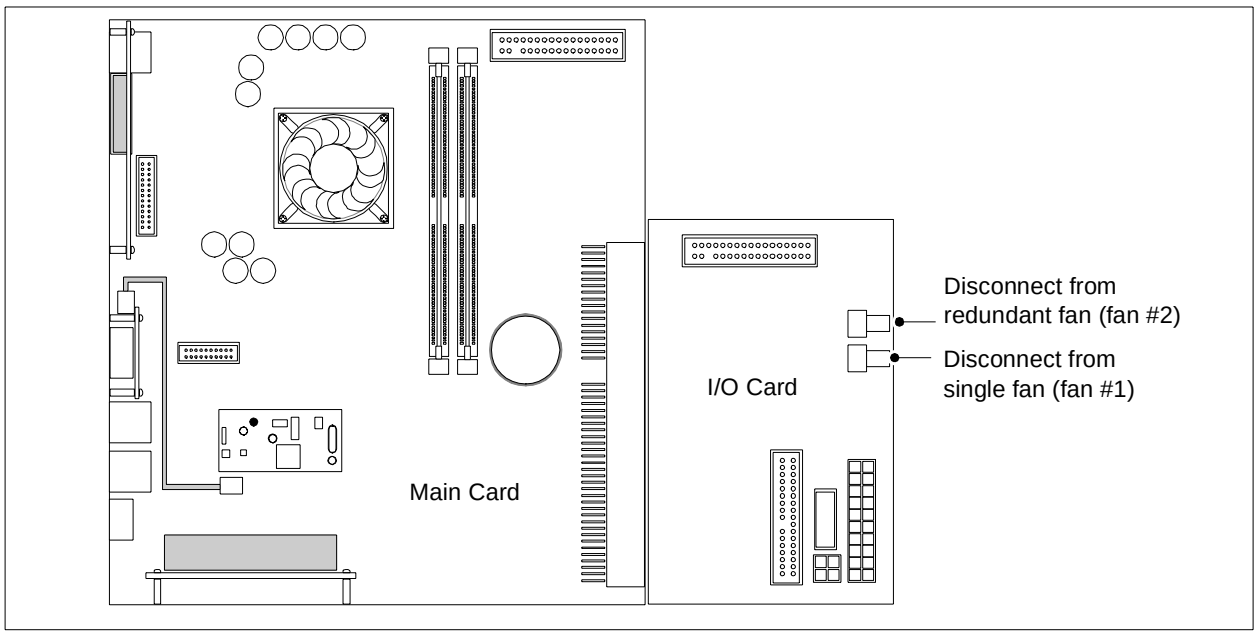
1. If you still have access to the Unified Manager, shut down the system using the Shutdown command. For details refer to "Shut down the system software" on page 195. Otherwise, skip to the next step.
2. Set up the Business Communications Manager for maintenance, as described in "Shut down the system hardware" on page 196.
3. Disconnect the Business Communications Manager system from the AC power outlet.
4. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
5. Remove the fan access panel at the rear of the platform base chassis (see Figure 123):
   a. Remove the fan access panel screws at the top and bottom of the panel. Place the screws in a safe location.
   b. Tip the top of the fan access panel toward you.
   c. Grasp the fan access panel with both hands and lift the away from the platform base chassis. Do not stretch the fan cable(s).

**Figure 123** Remove the BCM400 fan access panel



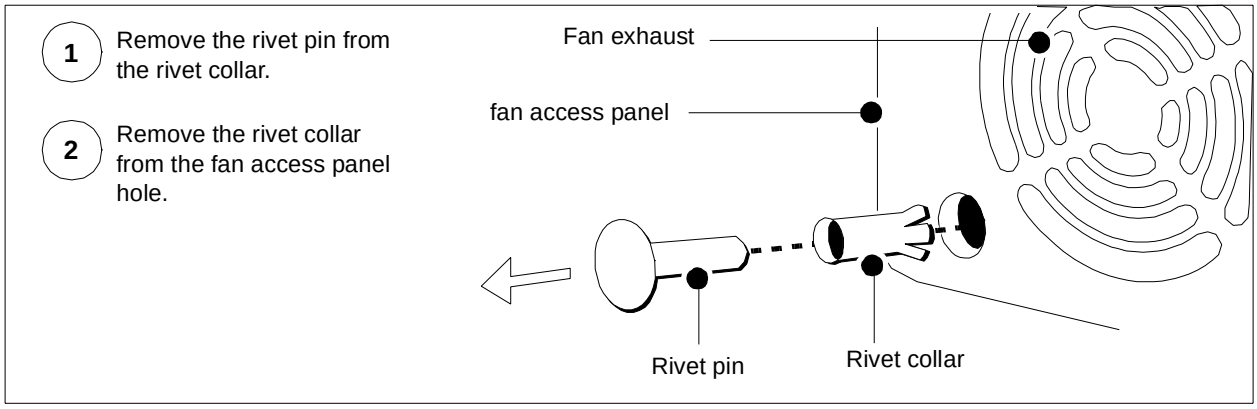

6. Disconnect the I/O card fan cable(s) - see Figure 124. For the BCM400 RFO configuration, disconnect both fan cables from the I/O card.

**Figure 124** Disconnect the fan cable from the I/O card




**7** Remove the snap rivets that hold the fan to the fan access panel. The snap rivet has two parts; a center pin and a collar. Gently separate the plastic rivet pin with your fingernails from the center of the rivet collar. Remove the rivet pin and collar from the fan access panel. Place the rivet pin and collar in a safe location.

**Figure 125** Remove the snap rivets from the BCM400 fan access panel




**8** Lift the fan away from the fan access panel and place it in a safe location.

**9** Repeat Steps 7 and 8 to remove the redundant fan on the BCM400 RFO configuration.

**10** This procedure is complete.

## Install a BCM400 cooling fan

Use this procedure to install a single or redundant cooling fan in a BCM400 platform base chassis.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

1 Place the new fan in the fan access panel in the position from which you removed the old fan. Ensure the I/O card connector cable is oriented to the bottom of the fan and that the fan label is closest to the grill on the panel.

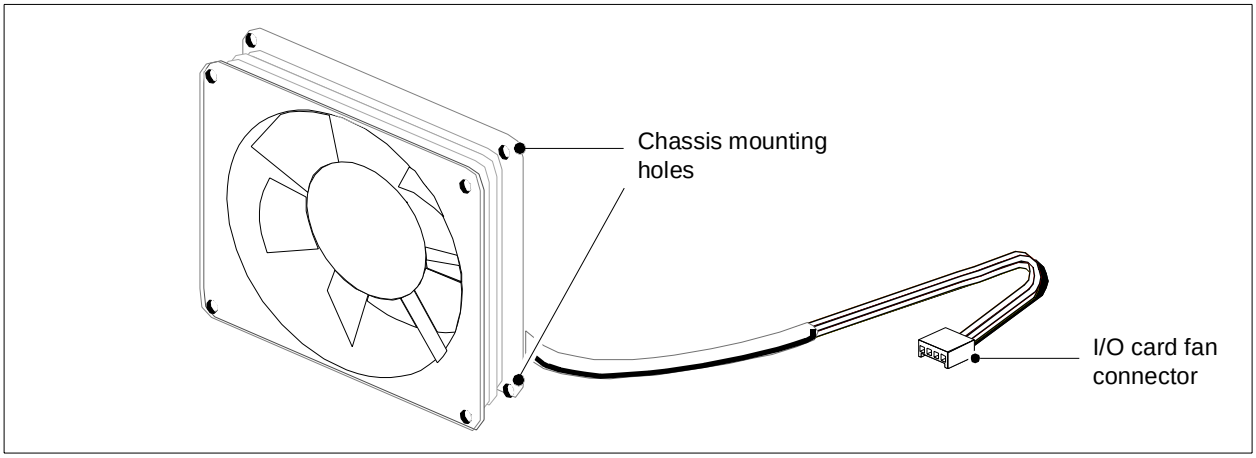
**Note:** Ensure the label of the new fan faces the back wall of the Business Communications Manager platform base chassis. Airflow is out of the chassis as indicated by the arrows imprinted on the fan.

**Note:** Redundant feature option (dual fans)
If you are installing a second fan, you must use the new fan access panel (included with the redundant feature option kit) on the back of the Business Communications Manager platform base chassis. The redundant fan access panel has two fan exhausts.

2 Attach the fan to the fan access panel using the four plastic rivets.

**a** Align the fan chassis mounting holes with the holes in the fan access panel (see Figure 126).

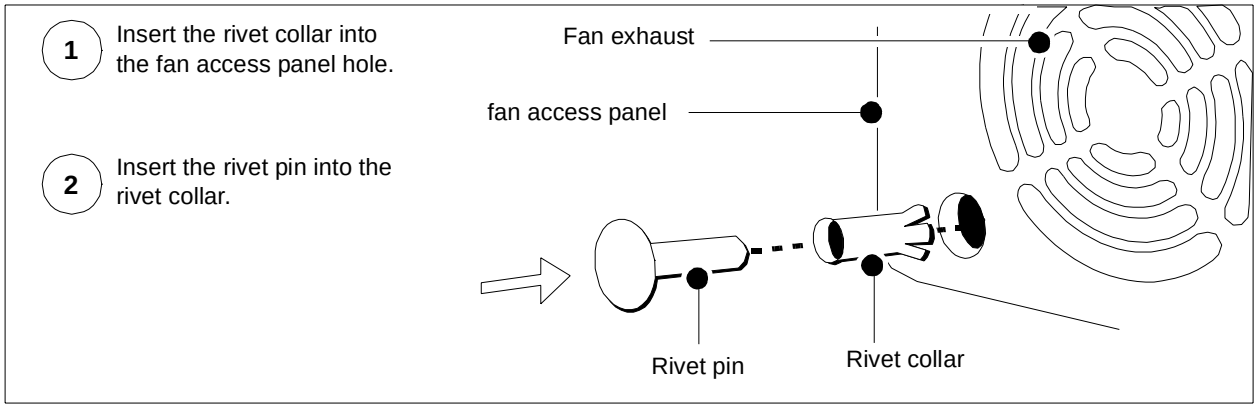
**Figure 126** Fan chassis mounting holes




**b** Hold the fan in place against the fan access panel. Push the rivet collar through the fan access panel and fan chassis mounting holes.

**c** Insert the rivet pin into the rivet collar. Repeat this step for the second fan in the BCM400 RFO configuration (see Figure 127).

**Figure 127** Insert the snap rivets into the BCM400 fan access panel

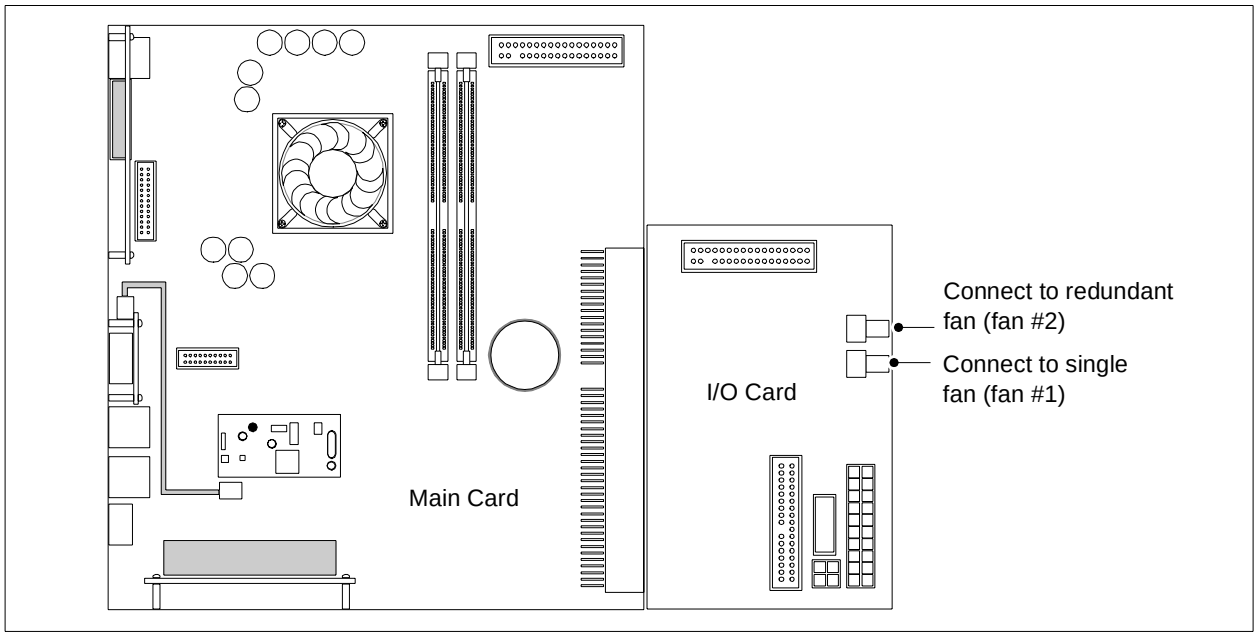



**3** Connect the power supply cables for each fan to the I/O card (see Figure 128):

**a** Connect Fan #1 (fan farthest from the power supply) to connector #1 on the I/O card.

**b** Connect Fan #2 (fan closest to the power supply) to connector #2 on the I/O card.

**Figure 128** Connect the fan cable(s) to the I/O card




**4** Mount the fan access panel to the platform base chassis (see Figure 129):

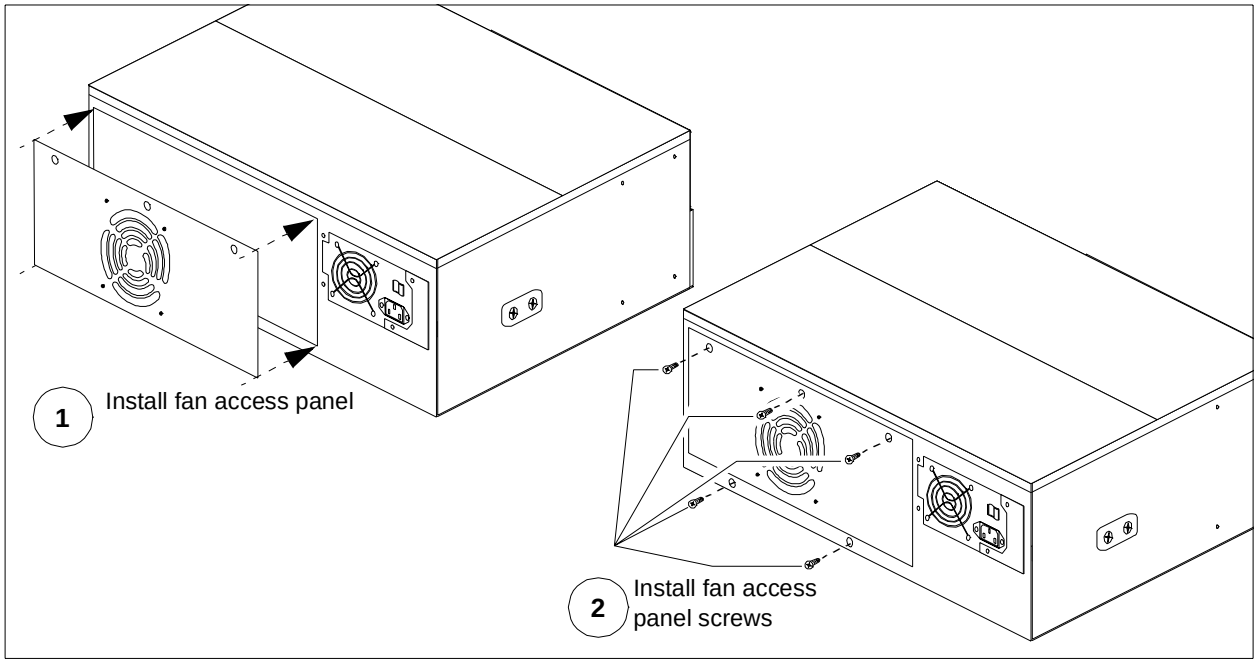
**a** Tip the top of the fan access panel toward you.

**b** Insert the bottom lip of the fan access panel in the platform base chassis.

**c** Align the screw holes in the fan access panel with the screw holes on the platform base chassis.

**d** Install and tighten the fan access panel screws.

**Figure 129** Install the fan access panel to the platform base chassis




5 Restore the Business Communications Manager system to operation. For details, refer to "Restart the System after Maintenance" on page 197.

The Business Communications Manager system starts up when you connect the AC power cord. The start-up process takes several minutes to complete.

6 Test the direction of the fan exhaust air flow to determine if the fan is correctly installed.

**a** Hold a piece of paper or your hand close to the fan exhaust. A correctly installed fan blows air away from the platform base chassis. If you are testing two fans, cover one fan at a time with your hand.

**b** If the fan exhaust air flow is incorrect, remove the cooling fan (See "Remove a BCM400 cooling fan" on page 244) and re-install the fan in the correct position (this procedure).

7 This procedure is complete.

## Remove a BCM200 cooling fan

Use this procedure to remove the cooling fan in a BCM200 platform configuration.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

1 If you still have access to the Unified Manager, shut down the system using the Shutdown command. For details refer to "Shut down the system software" on page 195. Otherwise, skip to step 2.

2 Set up the server for maintenance, as described in “Shut down the system hardware” on page 196.

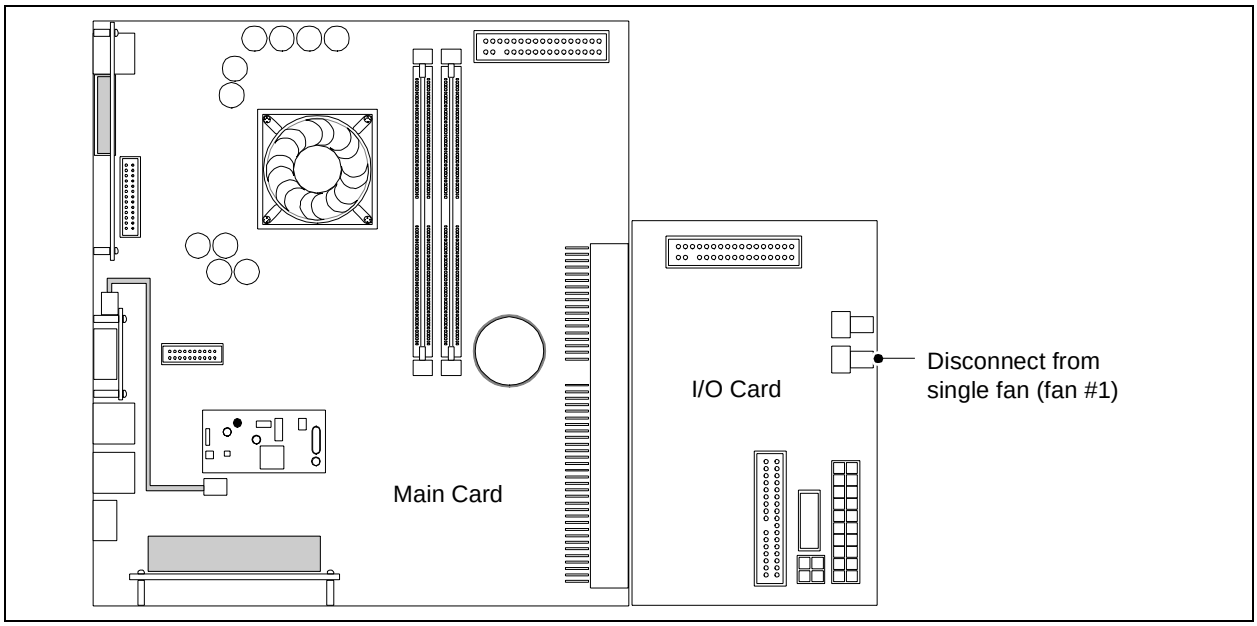
3 Disconnect the Business Communications Manager system from the AC power outlet.

4 Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.

5 Remove the top cover from the platform base chassis (see “Install the platform base chassis top cover” on page 213).

6 Disconnect the I/O card fan cable connection (see Figure 130).

**Figure 130** Disconnect the BCM200 fan cable from the I/O card



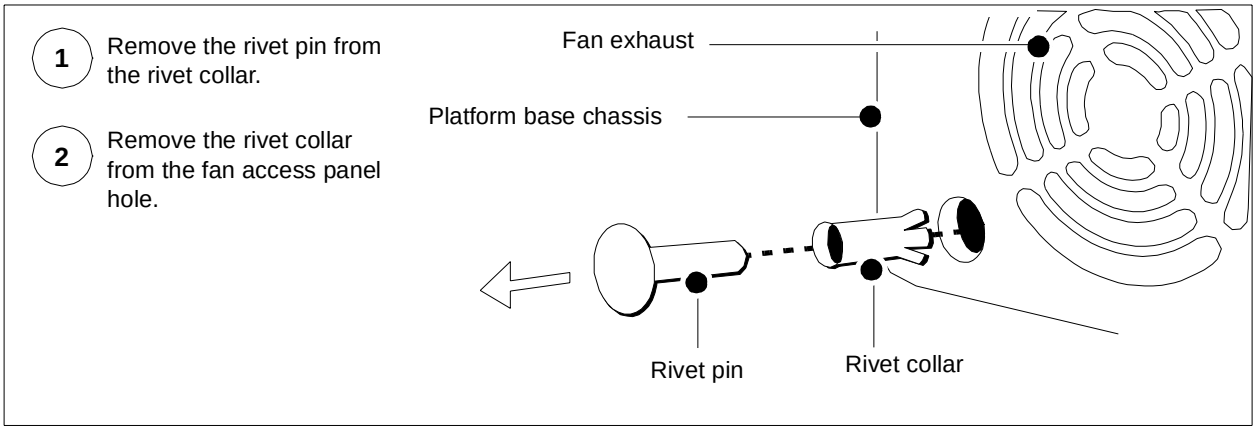

7 Remove the fan at the rear of the platform base chassis:

**a** Remove the snap rivets that hold the fan to the platform base chassis. The snap rivet has two parts; a center pin and a collar. Gently separate the plastic rivet pin with your fingernails from the center of the rivet collar. Remove the rivet pin and the collar from the chassis. Place the rivet pin and collar in a safe location.

**b** Pull the fan away from the platform base chassis (from the interior).

**c** Place the fan in a safe location.

**Figure 131** Remove the snap rivets from the BCM200 platform base chassis




**8** This procedure is complete.

## Install the BCM200 cooling fan

Use this procedure to install a cooling fan in a BCM200 platform base chassis.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

**1** Place the new fan in proper location in the platform base chassis. Ensure the I/O card connector cable is on the bottom.

**Note:** Ensure the label of the new fan faces the back wall of the Business Communications Manager platform base chassis. Airflow is out of the chassis as indicated by the arrows imprinted on the fan..

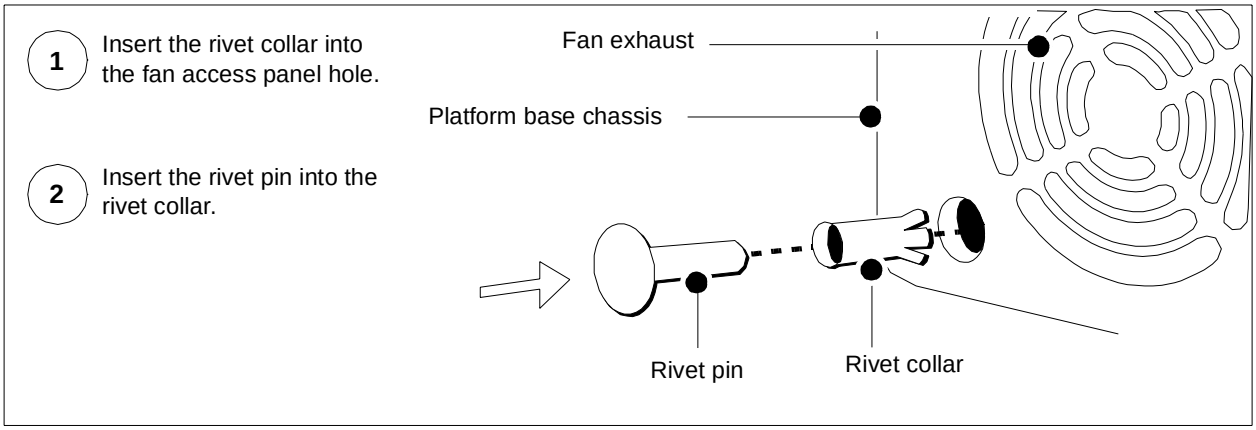
**2** Align the fan chassis mounting holes with the holes on the platform base chassis.

**3** Attach the fan to the platform base chassis using four snap rivets:

**a** Hold the fan in place and push the rivet collar through the fan access panel and fan chassis mounting holes.

**b** Insert the rivet pin into the rivet collar (see Figure 127).

**Figure 132** Insert the snap rivets into the BCM200 platform base chassis




4 Connect the power supply cable to the I/O card. Connect the Fan to connector #1 on the I/O card.

5 Replace the platform base chassis top cover. See "Install the platform base chassis top cover" on page 213.

6 Restore the Business Communications Manager system to operation. For details, refer to "Restart the System after Maintenance" on page 197.

The Business Communications Manager system starts up when you connect the AC power cord. The start-up process takes several minutes to complete.

7 Test the direction of the fan exhaust air flow to determine if the fan is correctly installed.

**a** Hold a piece of paper or your hand close to the fan exhaust. A correctly installed fan blows air away from the platform base chassis.

**b** If the fan exhaust air flow is incorrect, remove the cooling fan (See "Remove a BCM200 cooling fan" on page 249) and re-install the fan in the correct orientation (this procedure).

8 This procedure is complete.

## Remove an expansion unit fan

Use this procedure to remove a malfunctioning fan from the expansion unit:

The Business Communications Manager expansion unit comes either with one fan or a redundant fan set. The single-fan unit is not upgradeable.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

1 Shut down the system following the directions in "Shut down the system software" on page 195.

**2** Disconnect the fan power cable from the hub card.

**Note:** If the unit has redundant fans, each fan has a connector on the hub board.

**3** Locate the screws that fasten the fan casing to the expansion unit back wall and remove them. Refer to Figure 133.

**4** Remove the four screws (or snap rivets) that hold the fan to the expansion unit.

**5** Lift the failed fan out of the expansion unit.

**Figure 133** Fan screws location in expansion unit, 2.0 models.

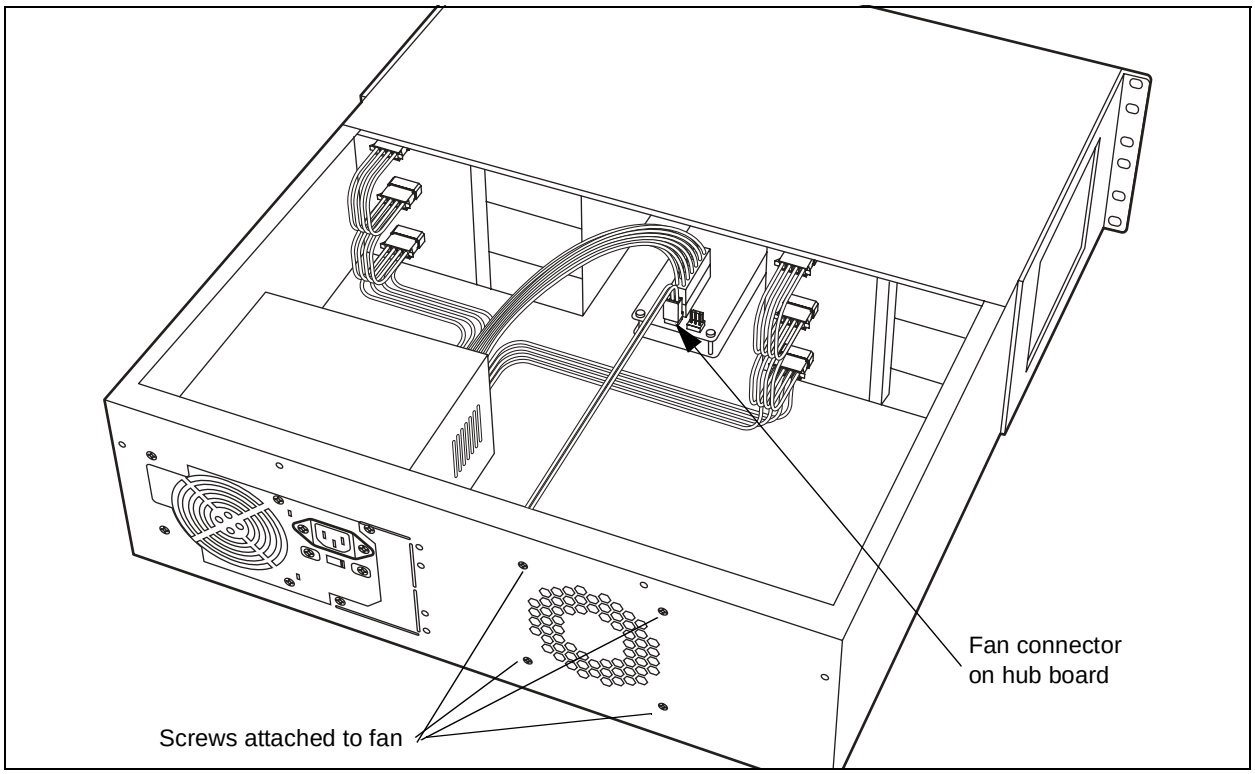
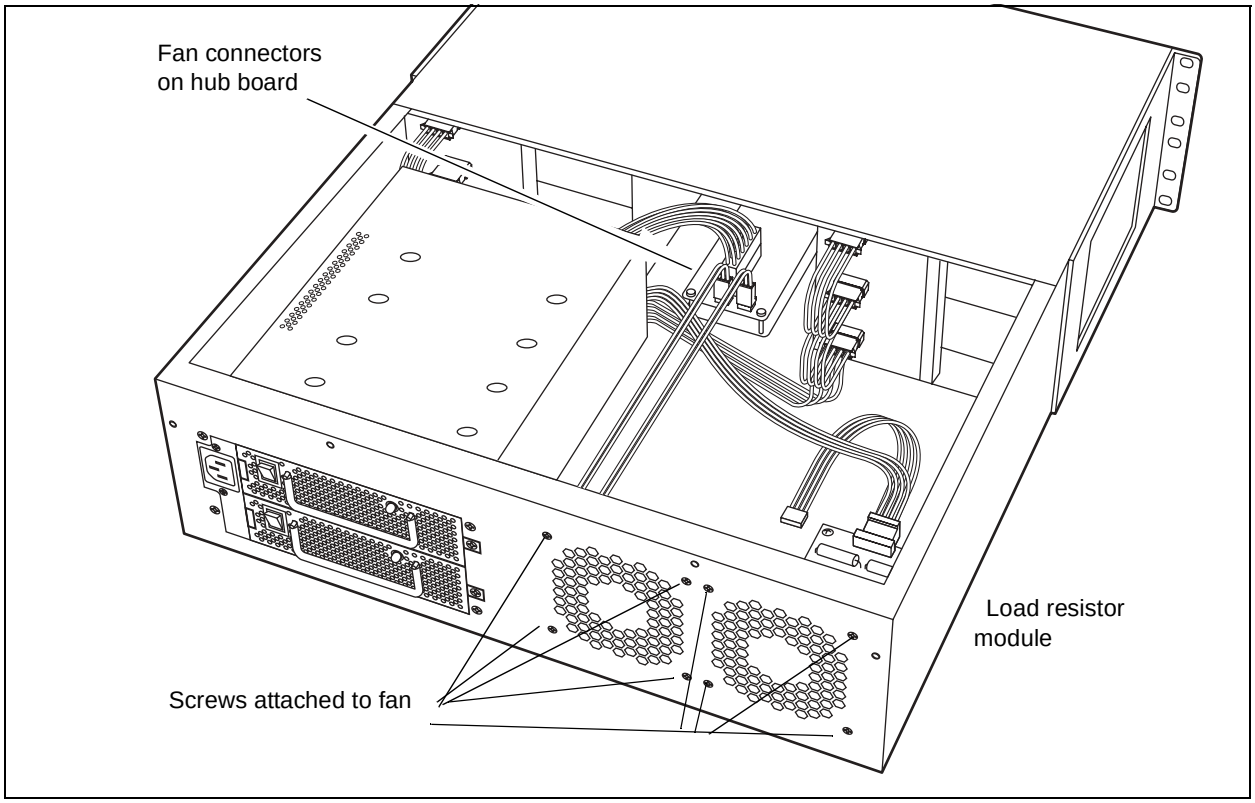


**Figure 134** Fan screws location in expansion unit, 2.5 redundancy models.




## Install an expansion unit fan

Use this procedure to install the fan in the Business Communications Manager expansion unit.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

**Note:** Ensure the label of the new fan faces the back wall of the Business Communications Manager expansion unit chassis. Airflow is out of the chassis as indicated by the arrows imprinted on the fan.

1. Place the fan in the expansion unit so that the label faces the back wall of the unit.
2. Align the screw holes in the fan with the screw holes in the expansion unit and attach the fan.
3. Connect the fan power supply cable to the hub board.
4. Replace the cover.
5. Restore the Business Communications Manager system to operation. For details, refer to "Restart the System after Maintenance" on page 197.

The Business Communications Manager system starts up when you connect the AC power cord. The start-up process takes several minutes to complete.

6 Test the direction of the fan exhaust air flow to determine if the fan is correctly installed.

   **a** Hold a piece of paper or your hand close to the fan exhaust. A correctly installed fan blows air away from the platform base chassis.

   **b** If the fan exhaust air flow is incorrect, remove the cooling fan (See “Remove a BCM200 cooling fan” on page 249) and re-install the fan in the correct orientation (this procedure).

7 This procedure is complete.

# Troubleshooting Fans

There are three LEDs on the front of the Business Communications Manager base function tray and one on the front of the expansion unit used to assess fan function. Table 49 describes the possible states of the fan and temperature LEDs.

**Table 49** Fan and temperature LEDs on the base function tray

| LED Label | Description | Green LED On | Red LED On (Only) |
|---|---|---|---|
| | Temperature | Temperature is below threshold. | Temperature is in alarm status.<br>Possible fan(s) failure. |
| | Fans | All installed fans are working | There is a problem with a minimum of one fan. |
| | Power | All components are working | Component failure |

# Chapter 9
# Replace or Upgrade a Power Supply

The BCM200 uses a standard power supply. The BCM400 and expansion units use either a standard or redundant power supply.

This chapter describes the following power supply installation and replacement techniques:


- "Replace a Standard Power Supply" on page 258
- "Upgrade to a redundant power supply" on page 270


**Note:** For the BCM400 RFO configuration only, a redundant power supply is included. Use a redundant fan with the redundant power supply (see "Install a BCM400 cooling fan" on page 247).

**Warning:** You must remove all of the connections to the Business Communications Manager before you power the system down.

Failure to disconnect lines before power down can cause damage to the system.

**Warning:** Protect the hardware components against damage from electrostatic discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

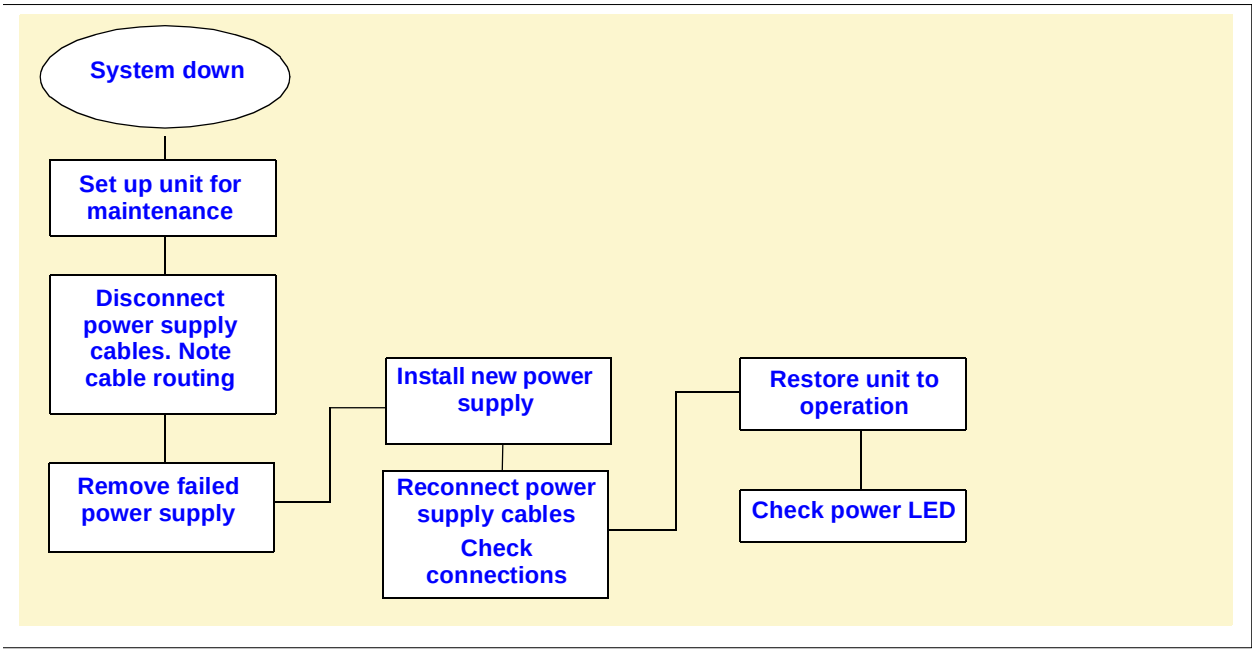
# Replace a Standard Power Supply

This section describes how to remove and install a standard power supply in the platform base chassis and contains the following procedures:


- "Remove a BCM200 standard power supply" on page 258
- "Install a BCM200 standard power supply" on page 261
- "Remove a BCM400 standard power supply" on page 265
- "Install a BCM400 standard power supply" on page 267


If the platform base chassis or expansion unit has a standard power supply that fails, then all activity on the system ceases. This procedure describes how to replace a failed standard power supply unit. Figure 135 provides an overview of the process to replace a standard power supply.

**Figure 135** Standard power supply replacement overview




## Remove a BCM200 standard power supply

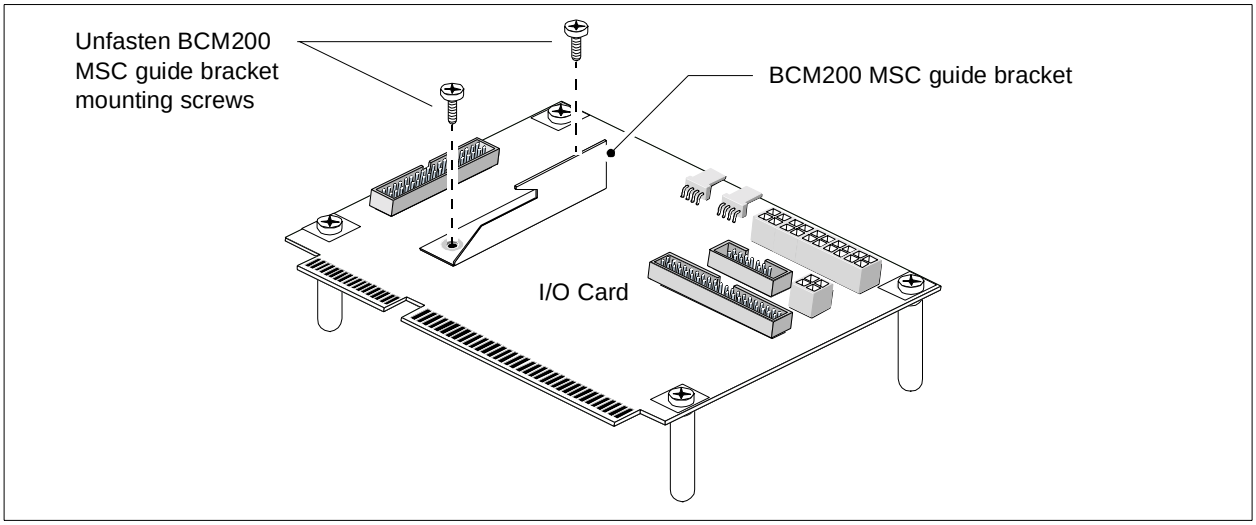
If the standard power supply fails, the system is down. Use this procedure to remove the standard power supply from a BCM200 platform base chassis.

**Warning:** Protect the hardware components against damage from electrostatic discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

**Warning:** Power supply cable management is critical. Cable damage can result due to loose or incorrectly positioned cables.

1. Set up the Business Communications Manager for maintenance (see "Shut down the system hardware" on page 196).
2. Disconnect all cables from the front of the base function tray. Disconnect the platform base chassis and the expansion unit (if applicable), from the AC power connection.
3. Remove the top cover from the platform base chassis (see "Remove the platform base chassis top cover" on page 211).
4. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
5. Locate and disconnect the power supply cables from the I/O card, media bay backplane, and hard disk.
6. Disconnect all cables from the I/O card.
7. Partially remove the base function tray (see "Remove the base function tray" on page 200). Continue to the next step in this procedure when complete.
8. Remove the screws that secure the MSC guide bracket to the I/O card. Place the MSC guide bracket and screws in a safe location (see Figure 136).

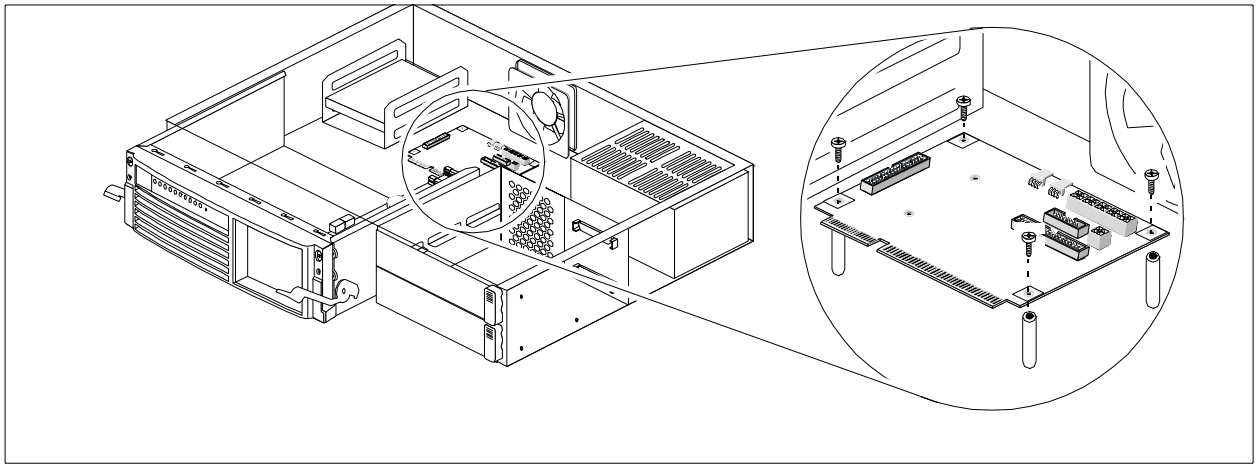
**Figure 136** Remove the BCM200 MSC guide bracket




9. Remove the screws that secure the I/O card to the platform base chassis (see Figure 137). Place the screws in a safe location.
10. Remove the I/O card from the platform base chassis. Place the I/O card in a safe, clean and static-free location.

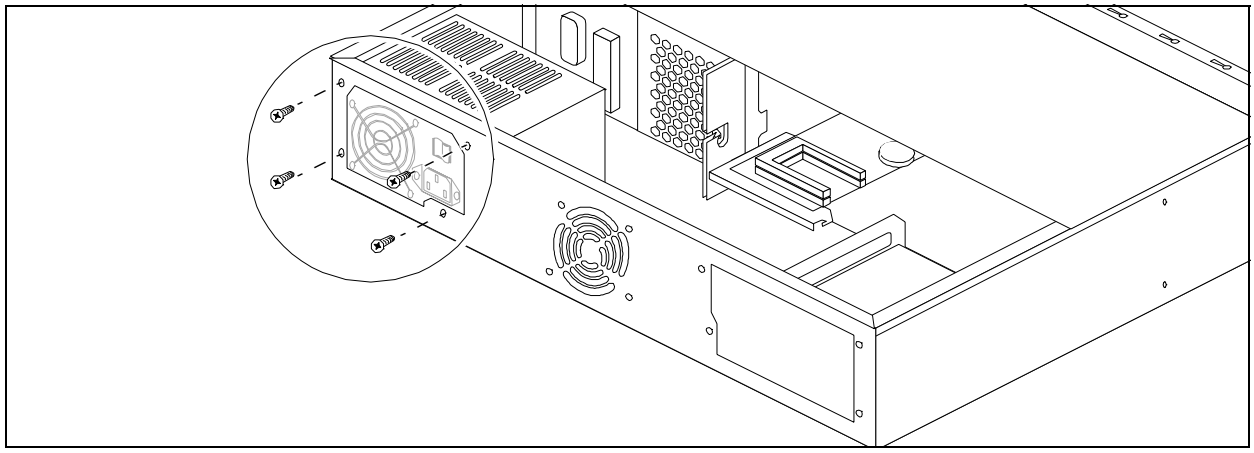
**Note:** Power supply and hard disk cables run underneath the I/O card. Remember the location and position of the power supply and hard disk cables. You will need to route the cables in the same manner when you re-install the power supply.

**Figure 137** Remove the I/O card from the BCM200 platform base chassis



**11** Remove the four power supply chassis screws from the back of the platform base chassis (see Figure 138). Place the screws in a safe location.

**Figure 138** Remove the BCM200 power supply chassis screws



**12** Separate the power supply cable from the hard disk cable. Cut the tie-wrap that secures the power supply cable to the hard disk cable (see Figure 140).

**13** Remove the power supply from the interior of the platform base chassis.

**Note:** Remove the power supply carefully. Ensure the power supply cables are not entangled or connected to any internal components.

**14** This procedure is complete.

## Install a BCM200 standard power supply

Use this procedure to install a functional standard power supply in a BCM200 platform base chassis. The I/O card must be removed from the platform base chassis before you perform this procedure. The base function tray must be partially removed.

**Warning:** Protect the hardware components against damage from electrostatic discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

**Warning:** Power supply cable management is critical. Cable damage can result due to loose or incorrectly positioned cables.

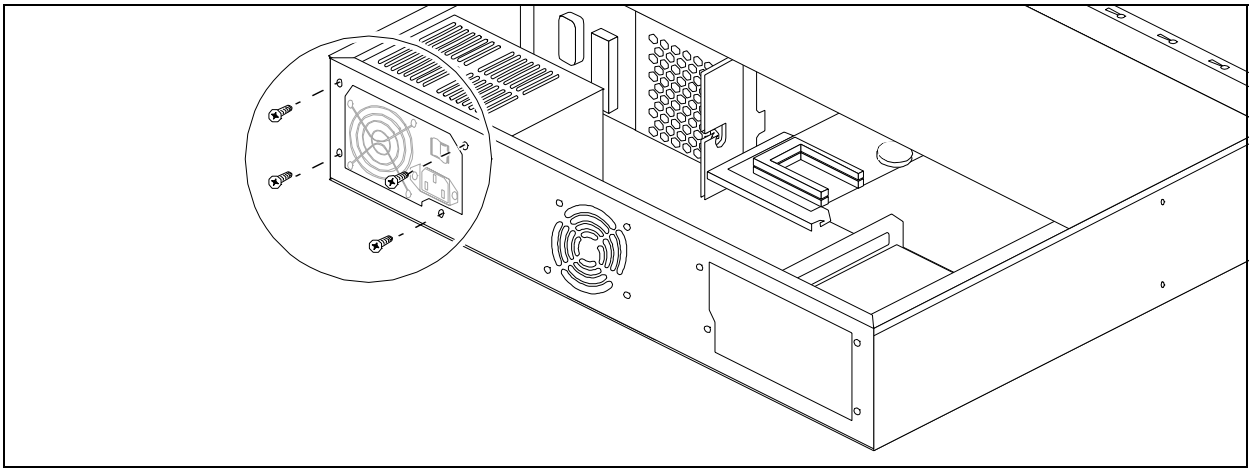
1 Obtain and use only the power supply recommended by Nortel Networks.

2 Place the new power supply into the platform base chassis.

**Note:** Install the power supply carefully. Ensure the power supply cables are not entangled or crushed against any internal components.

3 Secure the power supply to the platform base chassis. Align the power supply mounting holes with the chassis holes. Install the chassis screws at the rear of the platform base chassis. See Figure 139. Do not over-tighten the power supply chassis mounting screws.

**Figure 139** Install the BCM200 power supply chassis screws



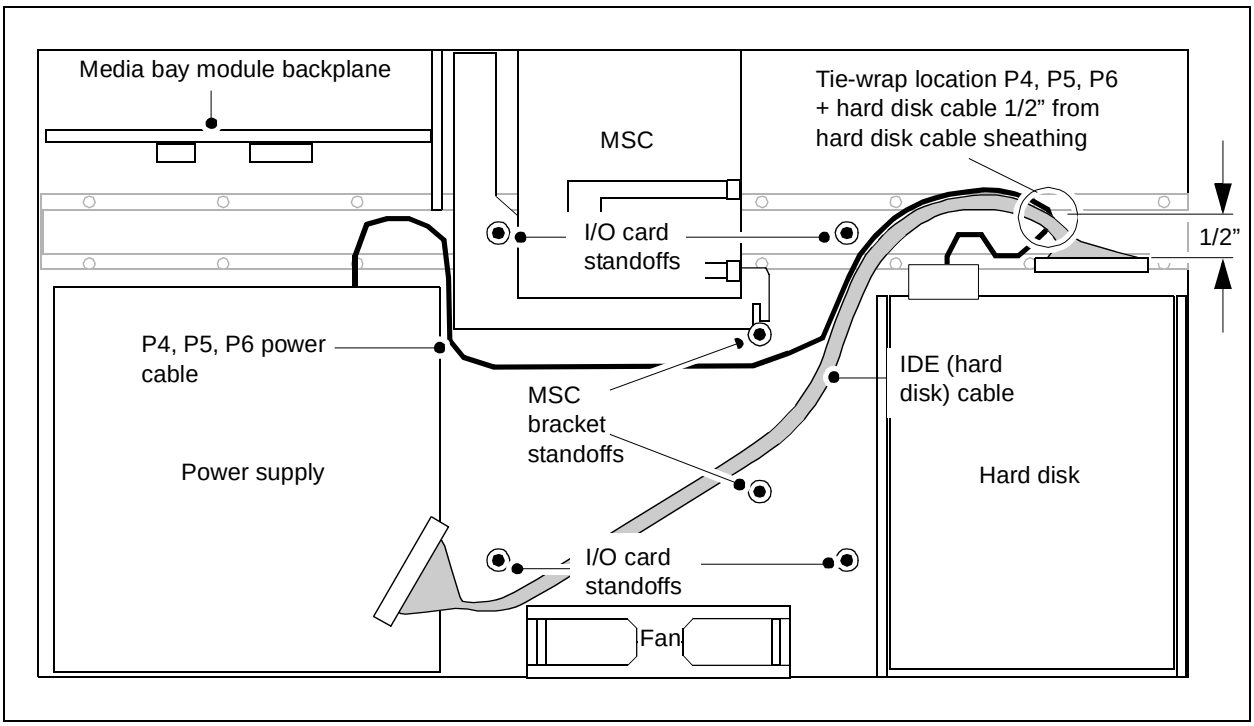
4 Run the P4, P5, P6 power supply cable and the IDE cable to the hard disk. The I/O card is not installed in the platform base chassis for this step.
Perform the following:

**a** Route the power cable between the I/O card chassis standoffs in the area shown (see Figure 140). Run the IDE cable in the same manner.

**b** Tie-wrap the power cable to the hard disk cable. Position the tie-wrap 1/2 inch from the hard disk cable sheathing.

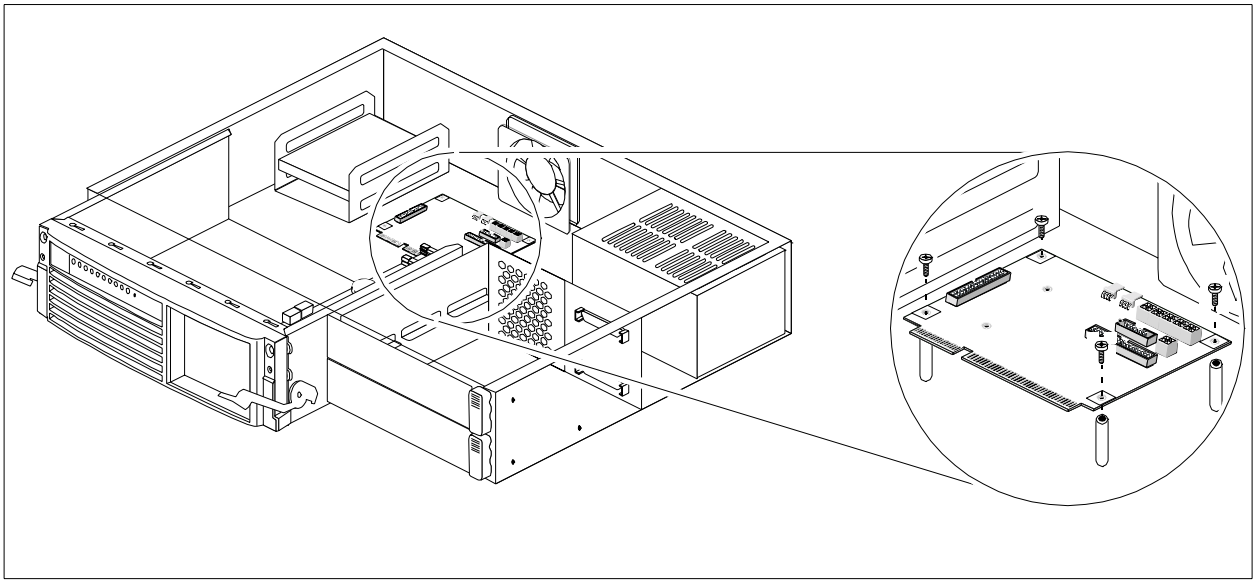
**c** Ensure the remainder of the power cable does not interfere with internal components.

**Figure 140** Power and hard disk cable routing



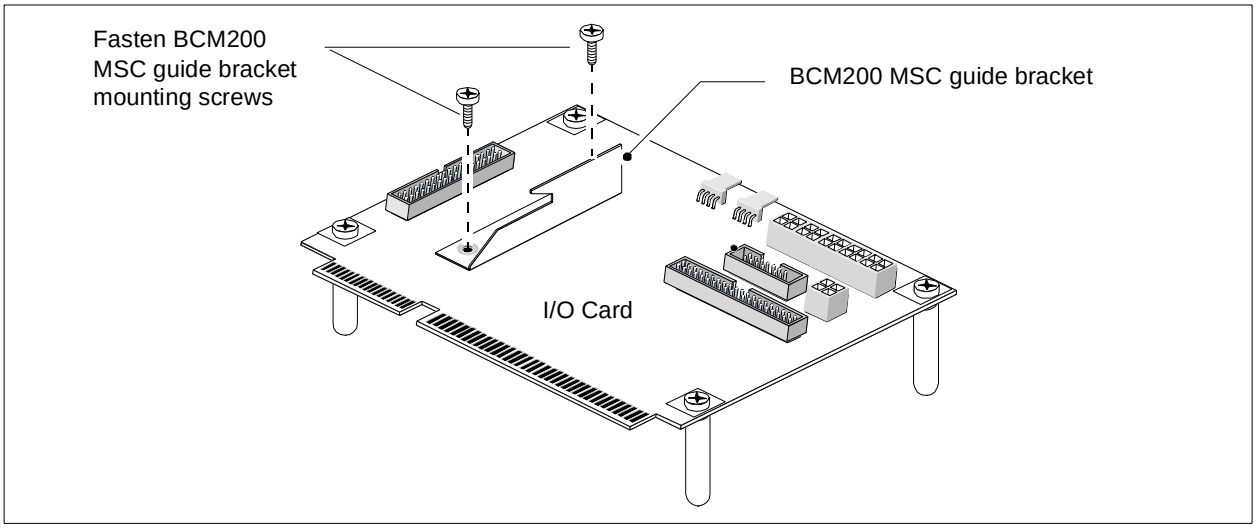

**5** Install the I/O card. See Figure 141. The I/O card installs on top of the power supply and IDE cables. Ensure the cables maintain their position as shown in the previous step.

**Figure 141** Install the I/O card in the BCM200 platform base chassis



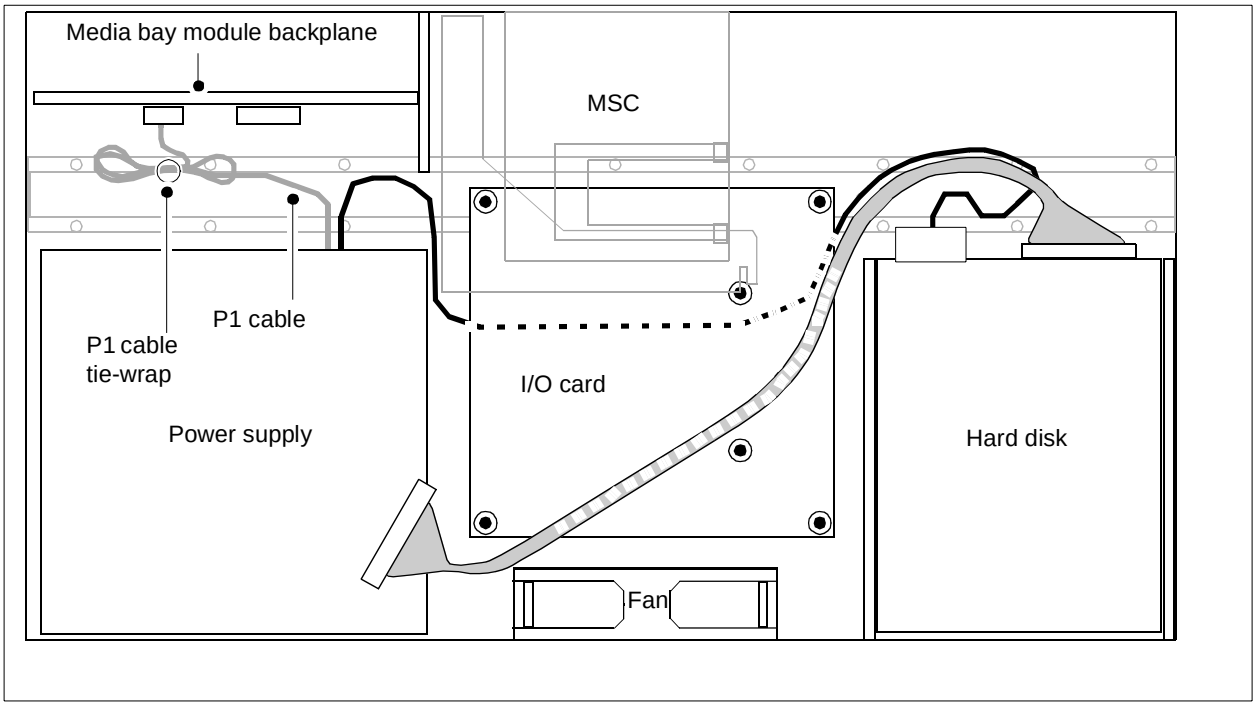
**6** Install the BCM200 MSC bracket (see Figure 142).

**Figure 142** Install the BCM200 MSC guide bracket




**7** Install a P1 power cable to the media bay backplane connector. Tie-wrap the excess cable as shown in Figure 143.

**Figure 143** Tie-wrap excess P1 power cable length




**8** Connect the hard disk cable to the secondary IDE I/O card connection. Connect the hard disk cable to the hard disk connector. Connect the power connector to the hard disk (see Figure 143). Insert extra connectors under the hard disk

**9** Connect the 20 Pin motherboard power cable (P1) and the +12v power Cable (P9) to the I/O card.

10 Loop the cables together and tie wrap to the side of the power supply to remove P1, P9, P3, P7/8 excess cable length. Fold the cables to the rear of the platform base chassis and secure with a tie-wrap. Ensure the cables are tied far enough back so they do not interfere with the insertion of the base function tray.

11 Attach the fan plug to the I/O card “Fan #1” connection. Loop excess fan cable length under the I/O card.

**Note:** Verify the power supply cables are connected correctly and do not interfere with any internal components.

12 Insert the base function tray fully into the platform base chassis. Ensure the base function tray does not interfer with any cabling.

13 Replace the platform base chassis top cover. See “Install the platform base chassis top cover” on page 213.

14 Press the power supply switch to the ON position (if applicable). Plug the Business Communications Manager power cord into an AC power outlet.

15 Restore the Business Communications Manager to operation. For details, refer to “Restart the System after Maintenance” on page 197. The Business Communications Manager system starts when you connect the AC power cord. Wait for the start-up process to finish.

16 Monitor the power LED on the base function tray. Refer to Table 50.

**Table 50** Power supply LED

| LED Label | Description | Green LED On | Green LED Flash | Red LED On (Only) | Green LED Off |
|---|---|---|---|---|---|
| ⏻ | Indicates state of system power. | OK | N/A | a minimum of 1 PS needs attention* | N/A |

a If the Business Communications Manager does not power-up, press the reset button on the base function tray front panel.

b If the Power LED is red, and does not respond to a manual reset, this indicates a faulty power condition. Contact your Nortel Networks representative.

c If the Power LED indicates green, the system is operating normally. Continue to the next step in this procedure.

17 This procedure is complete.

## Remove a BCM400 standard power supply

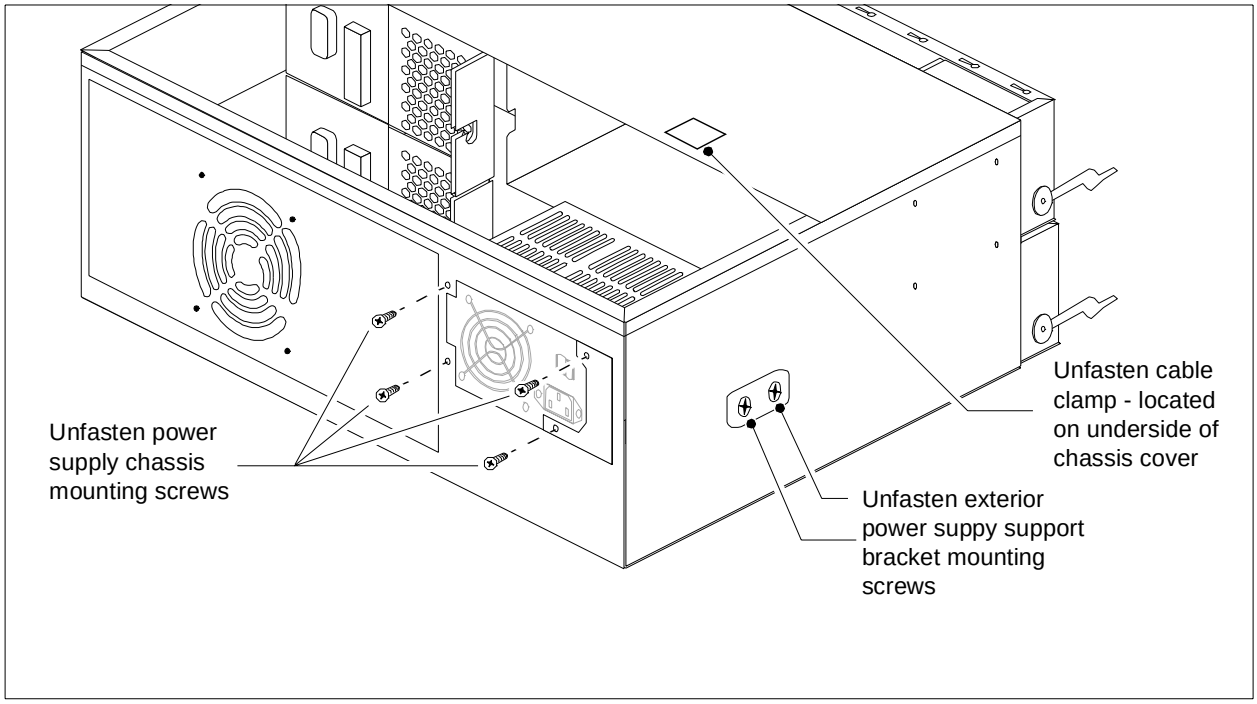
Use this procedure to remove the standard power supply from a BCM400 platform base chassis.

**Warning:** Protect the hardware components against damage from electrostatic discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

**Warning:** Power supply cable management is critical. Cable damage can result due to loose or incorrectly positioned cables.

1. Set up the Business Communications Manager for maintenance (see "Shut down the system hardware" on page 196).
2. Disconnect all cables from the front of the base function tray.
3. Disconnect the platform base chassis and the expansion unit (if applicable), from the AC power connection.
4. Remove the top cover from the platform base chassis (see "Remove the platform base chassis top cover" on page 211).
5. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
6. Disconnect all cables from the I/O card.
7. Locate and disconnect the power supply cables from the media bay backplane and hard disk.
8. Partially remove the base function tray (see "Remove the base function tray" on page 200). Continue to the next step of this procedure when complete.
9. Unfasten the power supply cable clamp located on the underside of the platform base chassis top cover (see Figure 144). Gather the power supply cables away from the interior and toward the rear of the platform base chassis.
10. Remove the four power supply chassis screws from the back of the platform base chassis (see Figure 144). Place the screws in a safe location.

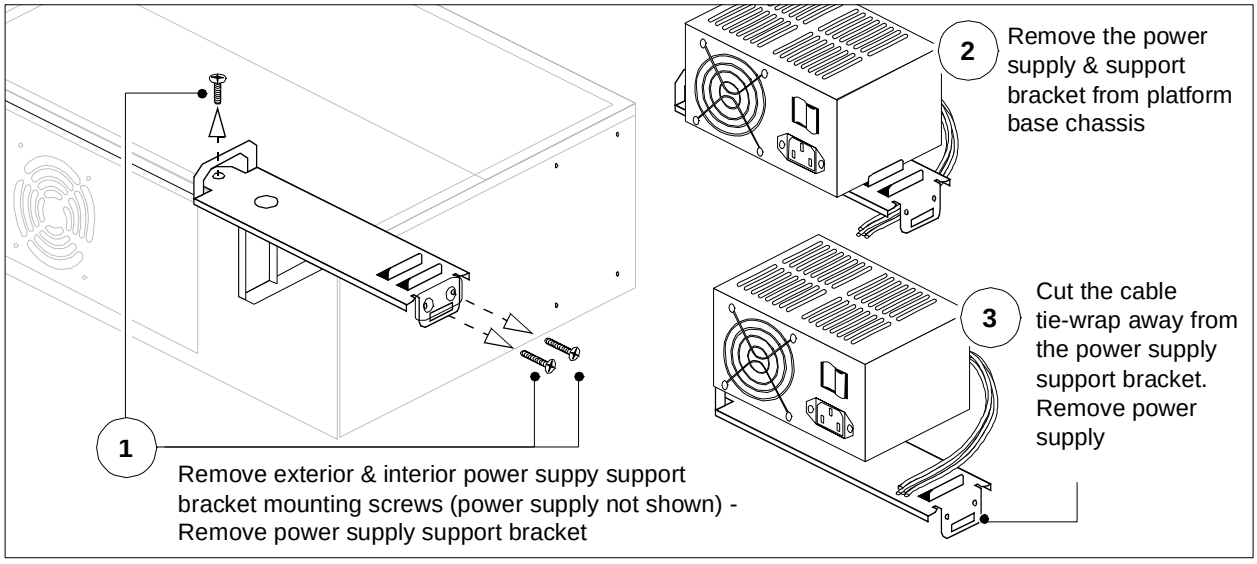
**Figure 144** Remove the BCM400 power supply chassis screws


Unfasten power supply chassis mounting screws
Unfasten cable clamp - located on underside of chassis cover
Unfasten exterior power suppy support bracket mounting screws

**11** Unfasten the exterior and interior power supply support bracket mounting screws (see Figure 145). Place the screws in a safe location.

**12** Remove the power supply and support bracket out and away from the BCM400 platform base chassis.

**Figure 145** Remove the power supply and support bracket


1
Remove exterior & interior power suppy support bracket mounting screws (power supply not shown) - Remove power supply support bracket
2
Remove the power supply & support bracket from platform base chassis
3
Cut the cable tie-wrap away from the power supply support bracket. Remove power supply

**13** Remove the tie-wrap from the power supply support bracket. Place the power supply in a safe, static free location.

**14** This procedure is complete.

## Install a BCM400 standard power supply

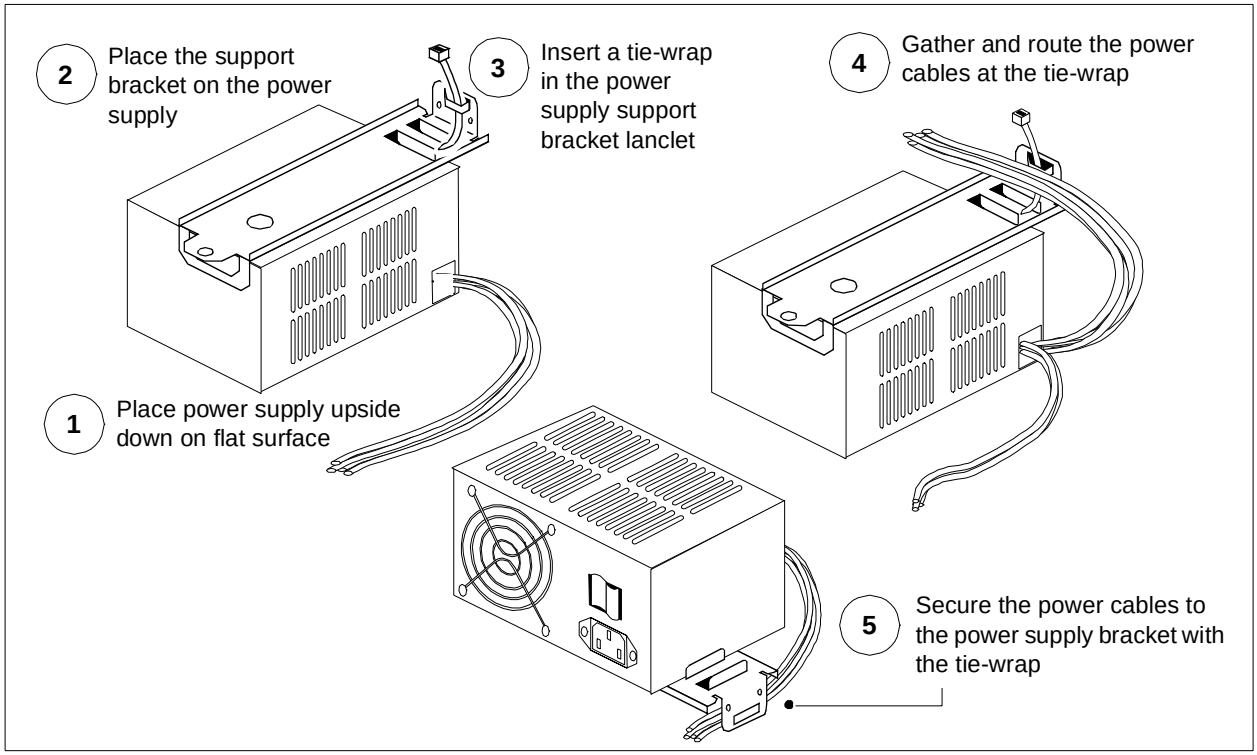
Use this procedure to install a functional standard power supply in a BCM400 platform base chassis. The base function and advanced function trays must be partially removed.

**Warning:** Protect the hardware components against damage from electrostatic discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

**Warning:** Power supply cable management is critical. Cable damage can result due to loose or incorrectly positioned cables.

1. Ensure the new power supply is an auto-adjust power supply.
2. Insert a tie-wrap in the power supply support bracket lanclet.
3. Place the standard power supply (top down) on a flat surface. Place the power supply support bracket on the bottom surface of the power supply.
4. Gather together and route the main card 20 Pin power cable (P1) and the +12v power cable (P9) at the tie-wrap.
5. Secure the the power cables to the power supply support bracket with the tie-wrap (from step 2) - see Figure 146.

**Figure 146** Fasten the power supply support bracket cables

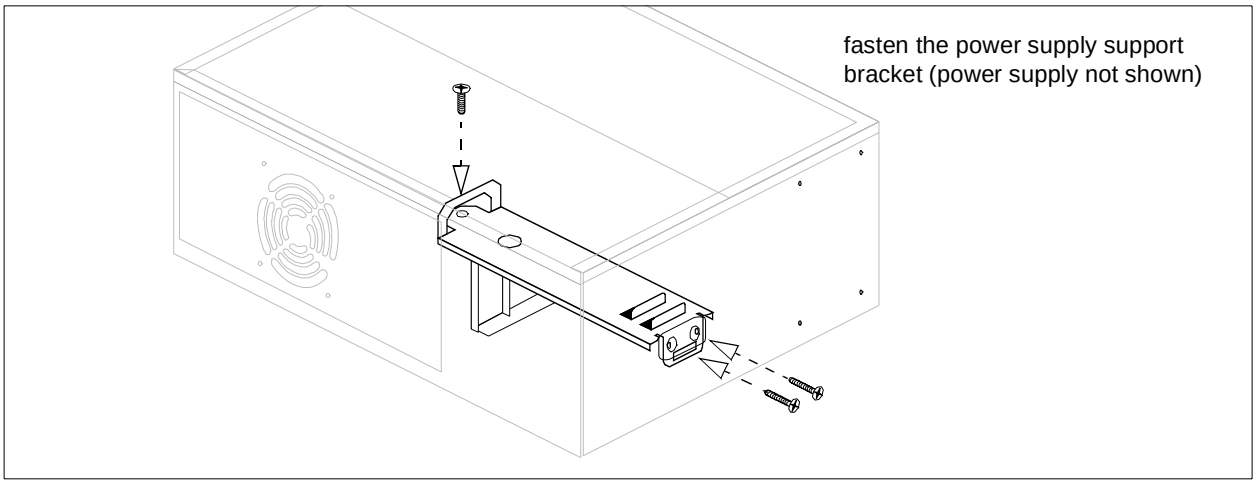

2
Place the support bracket on the power supply
3
Insert a tie-wrap in the power supply support bracket lanclet
4
Gather and route the power cables at the tie-wrap
1
Place power supply upside down on flat surface
5
Secure the power cables to the power supply bracket with the tie-wrap

6 Insert the standard power supply and support bracket in the platform base chassis. The power supply support bracket rests on the MSC guide bracket on one side, and the chassis wall on the other.

7 Ensure the mounting holes in the power supply support bracket align with the holes in the platform base chassis.

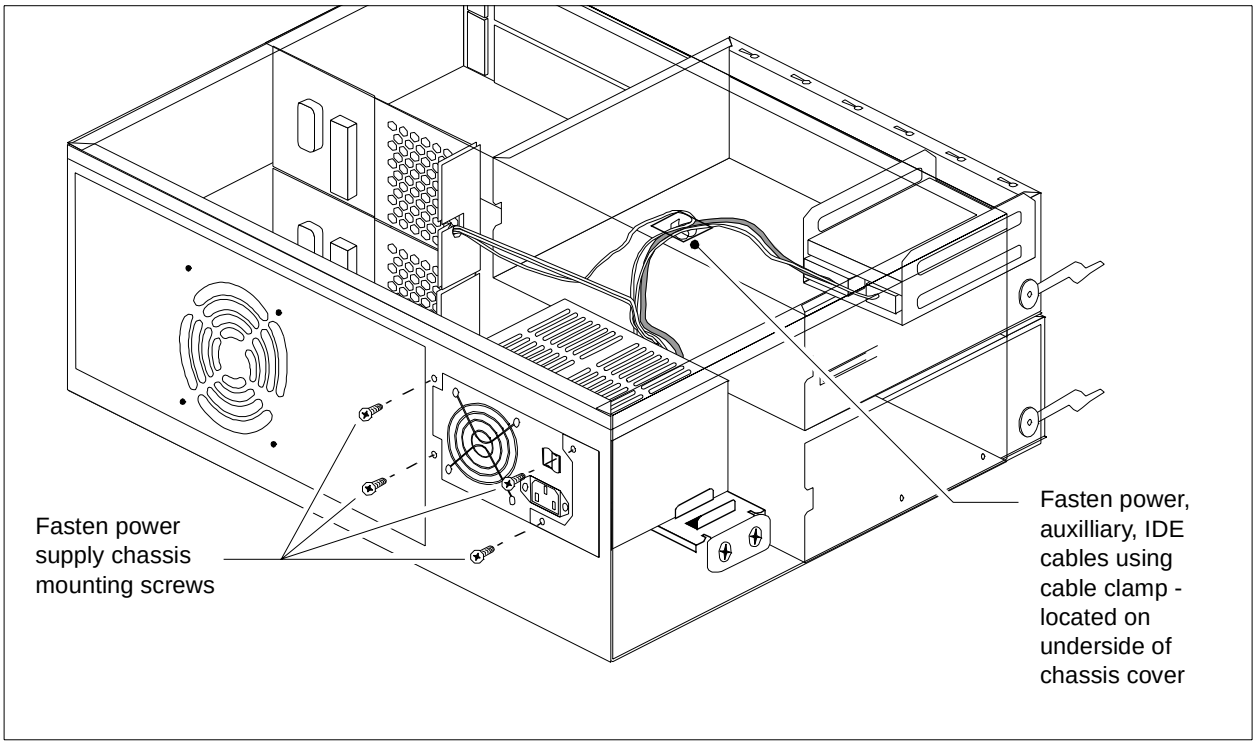
8 Fasten the power supply suppport bracket mounting screws (see Figure 147).

**Figure 147** Fasten the power supply support bracket to the platform base chassis




9 Align the mounting holes in the power supply with the chassis holes at the rear of the platform base chassis. Fasten the power supply mounting screws to the platform base chassis.

**Figure 148** Fasten the standard power supply to the platform base chassis


Fasten power supply chassis mounting screws
Fasten power, auxilliary, IDE cables using cable clamp - located on underside of chassis cover

**10** Attach the 20 pin motherboard connector and the +12V power connector into the I/O card.

**11** Route the power cable, auxilliary and IDE cable to the hard disk cage. Bundle the cables together and fasten to the roof of the platform base chassis using the cable clamp (see Figure 148).

**12** Connect the power cable and IDE cable to the hard disk.

**13** Run the auxilliary cable to the chassis cable slot (see next step).

**14** Connect cable runs P2 and P3 to the media bay backplane as follows.

- **a** Connect cable P2 into the bottom media bay module backplane power connector
- **b** Connect cable P3 into the top media bay module backplane connector.
- **c** Bundle power cables P2 and P3 along with auxiliary cable (P7/8) together with a grommet (see Figure 156).
- **d** Insert the P2, P3 and auxiliary cables into the cable slot on the chassis (secured with the grommet).

**15** This procedure is complete.

# Upgrade to a redundant power supply

Use the procedures in this section to upgrade a BCM400 platform base chassis, currently equipped with a standard power supply, with a redundant power supply. This section contains the following procedures:


- "Remove the PSU status connector jumper" on page 271
- "Install a redundant power supply cage" on page 272
- "Remove a BCM400 redundant power supply cage" on page 277
- "Install a power supply module" on page 279
- "Remove a power supply module" on page 281

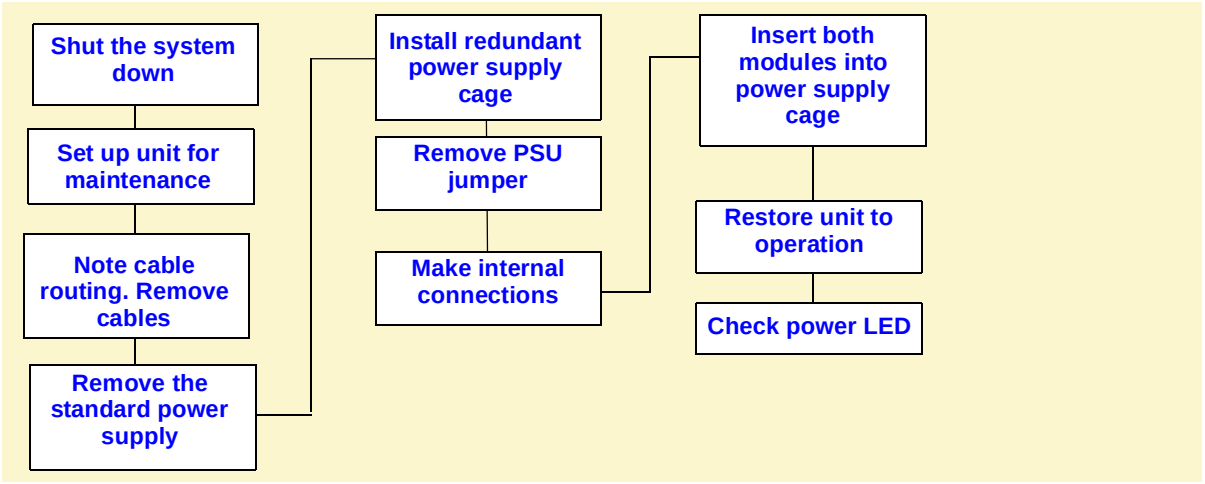

Figure 149 provides an overview of the steps required to upgrade your Business Communications Manager (BCM400) system from a standard power supply to a redundant power supply.

**Note:** A Business Communications Manager expansion unit with a standard power supply cannot be upgraded. You must replace the expansion unit chassis.

**Note:** When you install a redundant power supply, you must also install a redundant cooling fan included with the redundancy upgrade kit.

**Note:** When you install a redundant power supply, you must also remove the jumper installed in the PSU Status connector (RPS output signaling connector) on the I/O card.

**Figure 149** Redundant power supply upgrade overview


Shut the system down
Set up unit for maintenance
Note cable routing. Remove cables
Remove the standard power supply
Install redundant power supply cage
Remove PSU jumper
Make internal connections
Insert both modules into power supply cage
Restore unit to operation
Check power LED

## Remove the PSU status connector jumper

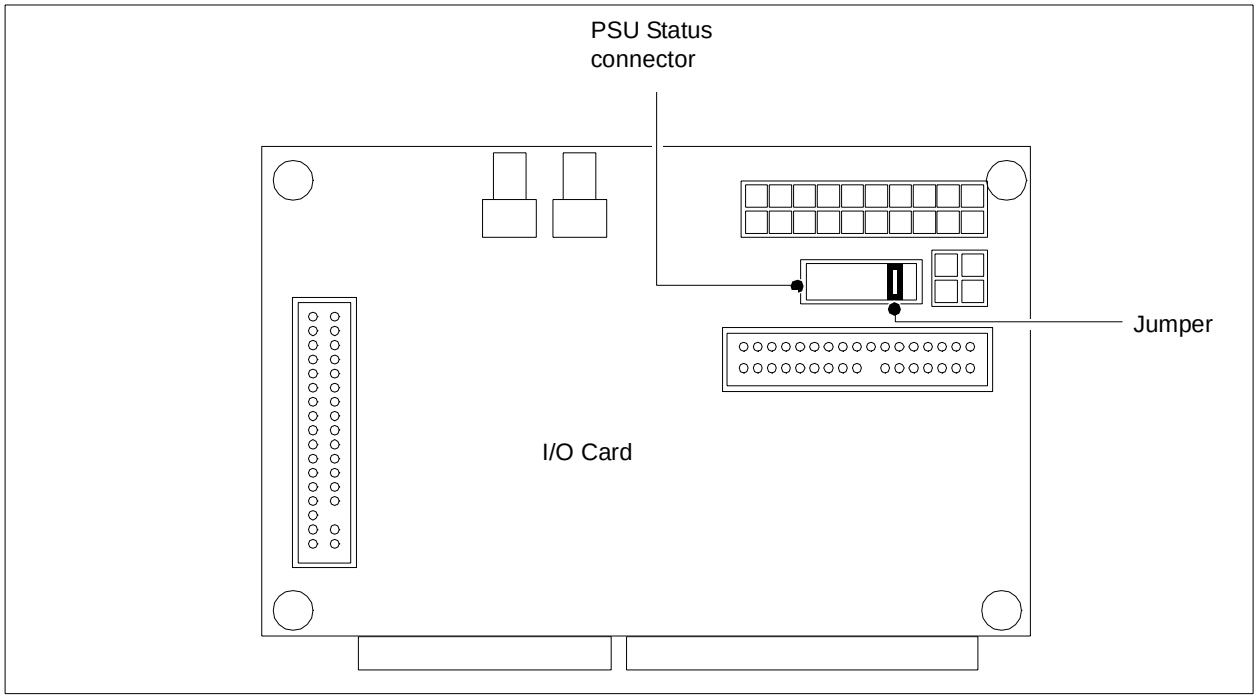
Use this procedure if you are installing a redundant power supply for the first time. Use this procedure only with the BCM400 platform base chassis.

**Note:** When you upgrade to a redundant power supply, you should also install a redundant fan. Refer to "Install a BCM400 cooling fan" on page 247.

**Warning:** Protect the hardware components against damage from electrostatic discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

1. If you still have access to the Unified Manager, shut down the system using the Shutdown command. For details, refer to "Shut down the system software" on page 195. Otherwise, skip to step 2.
2. Set up the Business Communications Manager for maintenance, as described in "Shut down the system hardware" on page 196.
3. Disconnect the BCM400 system from the AC power outlet.
4. Remove the platform base chassis top cover. Refer to "Remove the platform base chassis top cover" on page 211. Continue to the next step in this procedure when complete.
5. Locate the PSU Status connector on the I/O card (see Figure 150).
6. Remove the RPS output signaling connector jumper. Use needle-nose pliers to pull the jumper out and away from the connector. Place the jumper in a safe location.
7. Connect the PA cable to the PSU status connector (see Figure 32 on page 67).

**Figure 150** Remove the PSU status connector jumper




**8** This procedure is complete.

## Install a redundant power supply cage

This procedure describes how to install a redundant power supply cage in the BCM400 platform base chassis. After you install the redundant power supply cage in the platform base chassis, install the two power supply modules (see “Install a power supply module” on page 279).

Use this procedure only with the BCM400 platform base chassis.

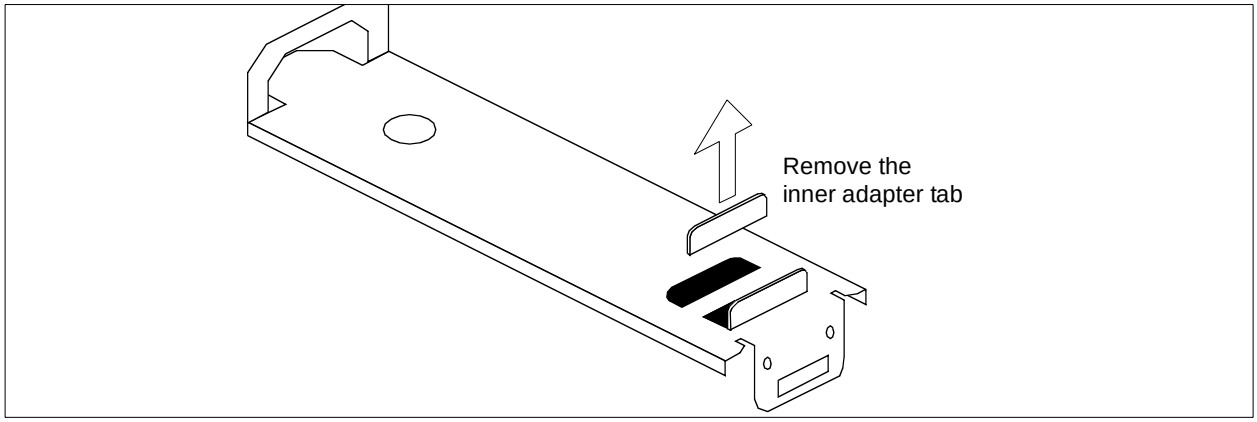
**Note:** When you upgrade to a redundant power supply, you should also install a redundant fan. Refer to “Install a BCM400 cooling fan” on page 247.

**Note:** When you install a redundant power supply, you must also remove the jumper installed in the PSU Status connector (RPS output signaling connector) on the I/O card. See Remove the PSU status connector jumper on page 271.

**Warning:** Protect the hardware components against damage from electrostatic discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

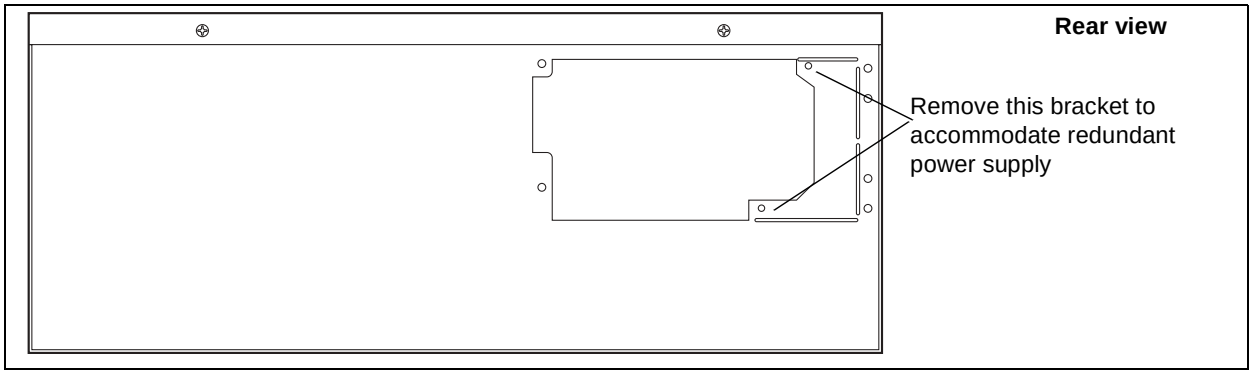
1. If you still have access to the Unified Manager, shut down the system using the Shutdown command. For details, refer to "Shut down the system software" on page 195. Otherwise, skip to step 2.
2. Set up the Business Communications Manager for maintenance, as described in "Shut down the system hardware" on page 196.
3. Disconnect the BCM400 system from the AC power outlet.
4. Remove the standard power supply from the platform base chassis (see Remove a BCM400 standard power supply on page 265). Continue to the next step in this procedure when complete.
5. Remove the power supply support bracket from the platform base chassis (see Remove a BCM400 standard power supply on page 265). Continue to the next step in this procedure when complete.
6. Remove the power supply adapter tab from the support bracket (see Figure 151). Use pliers to bend and snap the tab away from the support bracket. Make sure you remove only the inner adapter tab.

**Figure 151** Remove the BCM400 power supply adapter tab from the support bracket




7. Remove the knockout plate from the rear of the platform base chassis (see Figure 152).

**Figure 152** Remove the power supply knockout bracket



8 Remove both power supply modules from the redundant power supply cage before you install the power supply in the platform base chassis (see Remove a power supply module on page 281). Continue to the next step of this procedure when complete.

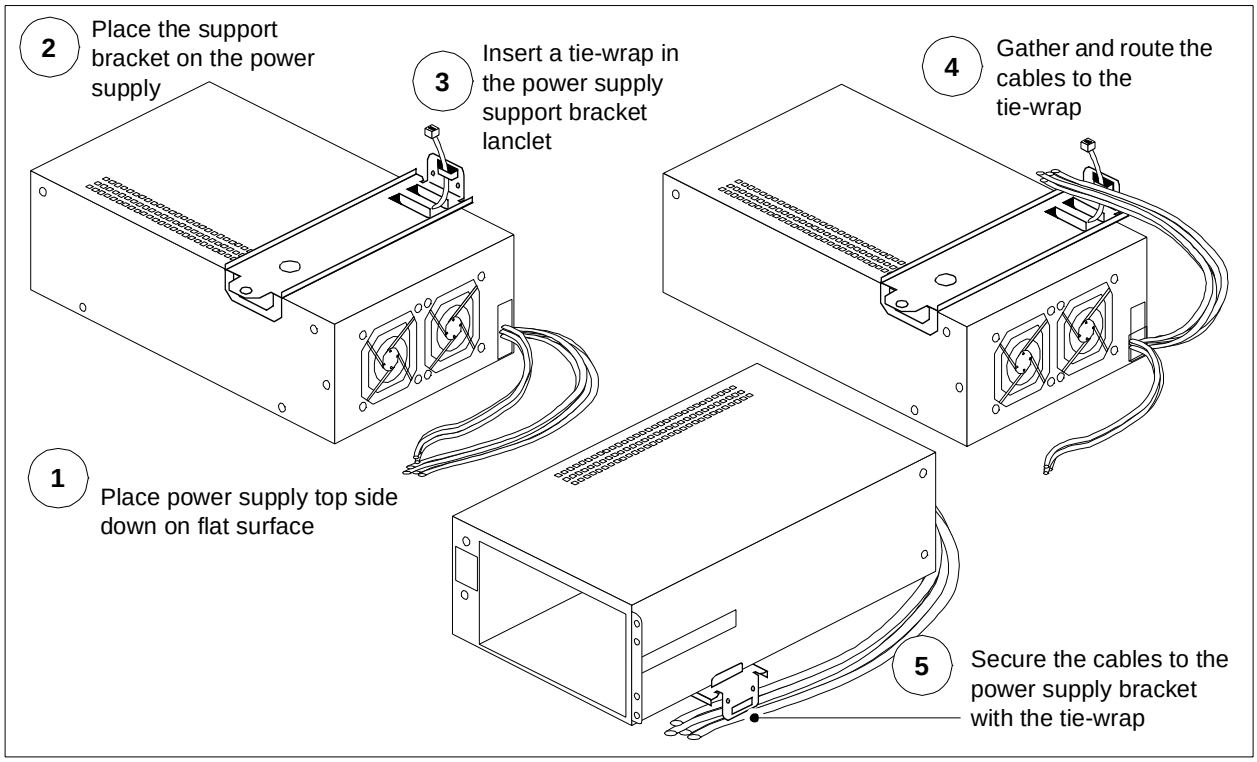
9 Place the redundant power supply (top down) on a flat surface. Place the power supply support bracket on the bottom surface of the power supply.

10 Insert a tie-wrap in the power supply support bracket lanclet.

11 Gather together and route the Motherboard 20 Pin power cable (P1) the +12v power cable (P9), the 3.3v load cable (PB), and the PS monitor Cable (PA) to the tie-wrap.

12 Secure the the cables to the power supply support bracket with a tie-wrap (see Figure 146).

**Figure 153** Fasten the power supply support bracket cables


2
Place the support bracket on the power supply
3
Insert a tie-wrap in the power supply support bracket lanclet
4
Gather and route the cables to the tie-wrap
1
Place power supply top side down on flat surface
5
Secure the cables to the power supply bracket with the tie-wrap

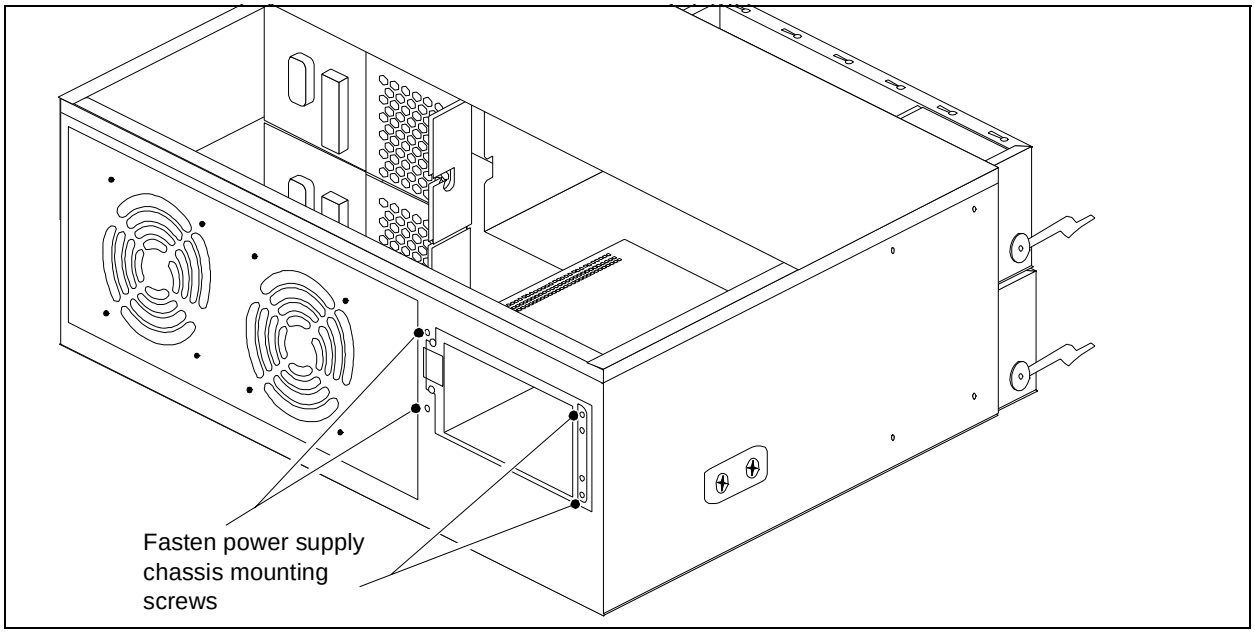
13 Install the power supply support bracket in the BCM400 platform base chassis (see Figure 147).

14 Position the redundant power supply cage in the base platform chassis. Make sure the power supply module tray opening faces the rear of the platform base chassis.

15 Align the mounting holes in the redundant power supply cage with the screw holes in the platform base chassis.

16 Attach the redundant power supply cage to the platform base chassis using the four chassis mounting screws. Refer to Figure 154.

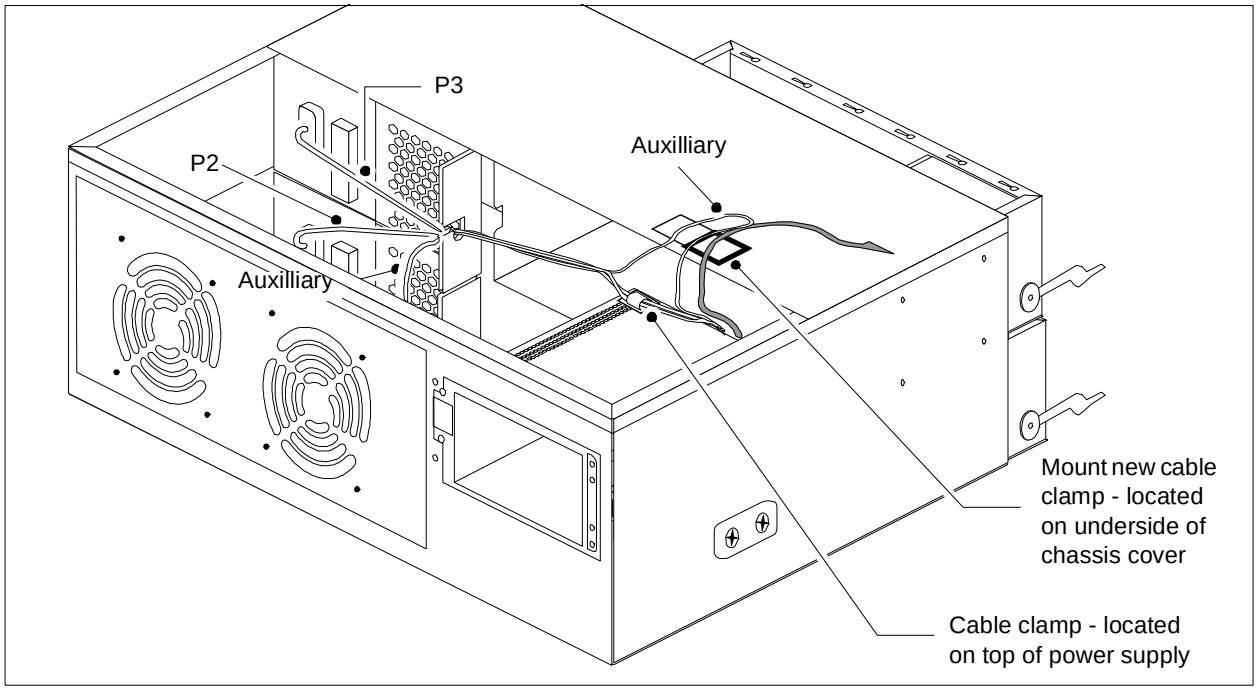
**Figure 154** Attach the redundant power supply cage




**17** If you have not already done so, install a redundant fan into the unit. Refer to "Install a BCM400 cooling fan" on page 247. Continue to the next step of this procedure when complete.

**18** Install a new cable clamp on the underside of the top cover. Place the new cable clamp beside the existing cable clamp (see Figure 155). Use the cable clamp to secure the power, IDE and auxilliary cables to the roof of the platform base chassis.

**Figure 155** Install a new cable clamp



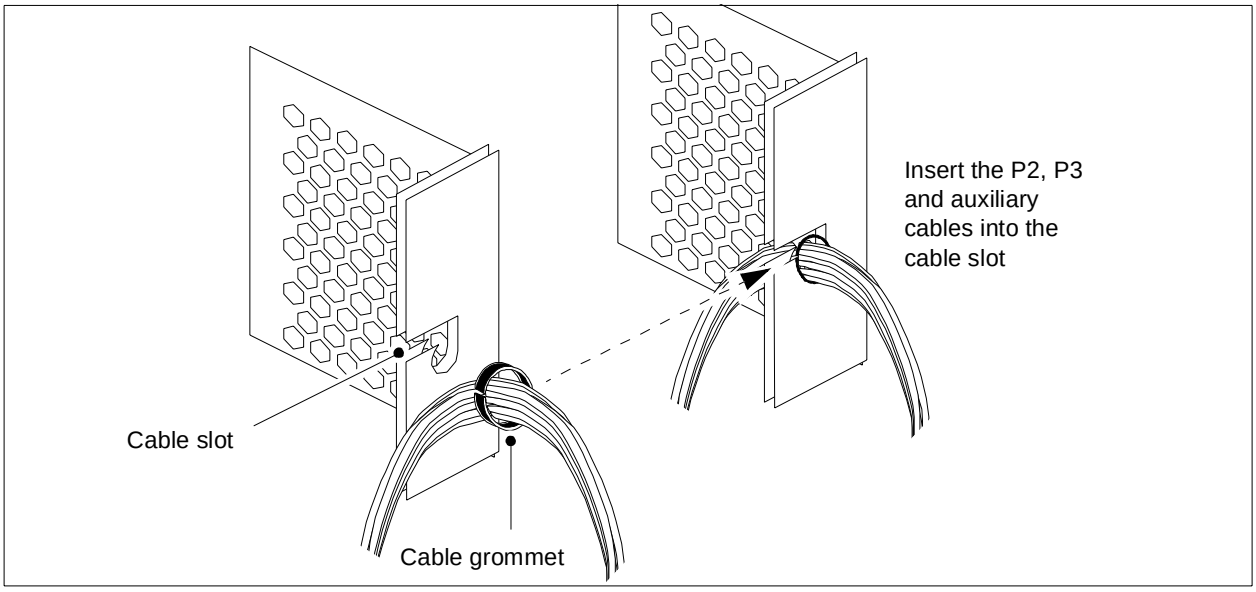
**19** Run the power supply, auxilliary and IDE cables to the hard disk. Secure these cables in the new cable clamp.

**Note:** Verify the power supply cables are connected correctly, completely and are routed so they do not interfere with any internal components when moved.

**20** Connect cable runs P2 and P3 to the media bay backplane (see Figure 155) as follows:

- **a** Bundle the cables together. Run the cables on the top of the power supply chassis and secure with the cable clamp.
- **b** Connect cable P2 into the bottom media bay module backplane power connector
- **c** Connect cable P3 into the top media bay module backplane connector.
- **d** Bundle power cables P2 and P3 along with auxiliary cable (P7/8) together with a grommet (see Figure 156).
- **e** Insert the P2, P3 and auxiliary cables into the cable slot on the chassis (secured with the grommet).
- **f** Ensure that one power run connects to one MBM backplane connector. Do not connect a single power run to both MBM backplane connectors.

**Figure 156** Install a cable grommet




**21** Install the platform base chassis top cover. See “Install the platform base chassis top cover” on page 213. Continue to the next step of this procedure when complete.

**22** This procedure is complete.

## Remove a BCM400 redundant power supply cage

Use this procedure to remove an existing redundant power supply cage from the BCM400 platform base chassis.

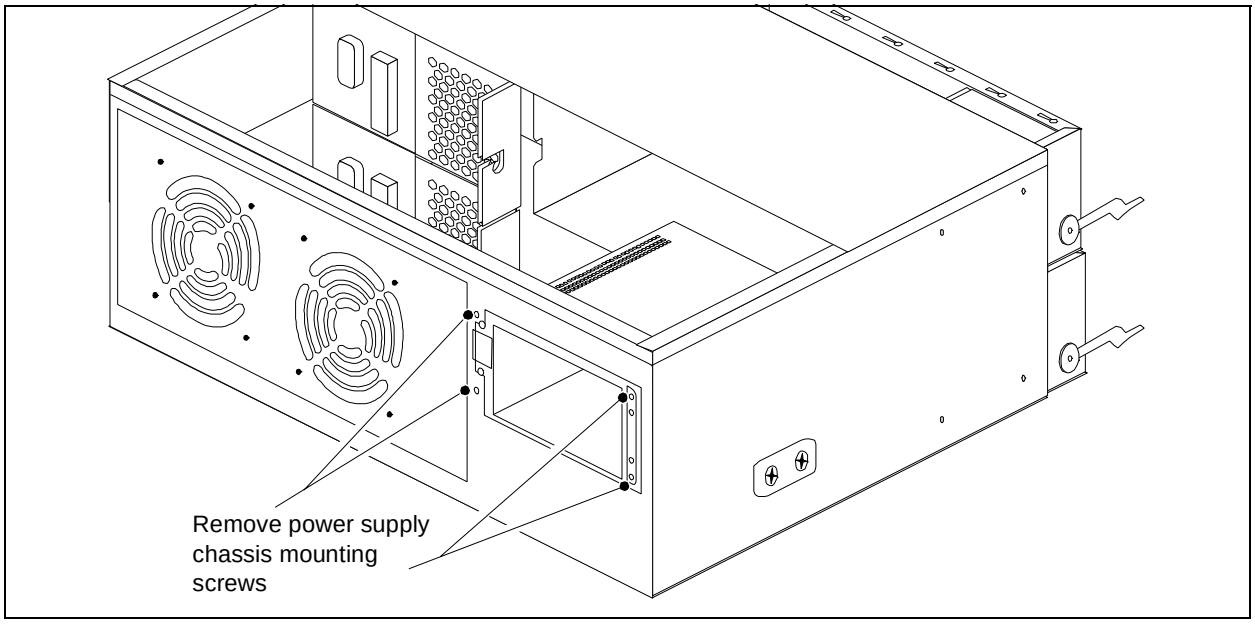
**Warning:** Protect the hardware components against damage from electrostatic discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

**Warning:** Risk of shock.
Hazardous voltage levels are maintained for several seconds on removable modules. Do not completely remove the module from the power supply cage for several seconds after disengaging the module from the cage.

1. Set up the server for maintenance (see "Shut down the system hardware" on page 196). Disconnect all cables from the front of the base function tray.
2. Disconnect the platform base chassis and the expansion unit (if applicable), from the AC power connection.
3. Remove the top cover from the BCM400 platform base chassis (see "Remove the platform base chassis top cover" on page 211).
4. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
5. Remove the power supply modules (see Remove a power supply module on page 281). Continue to the next step in this procedure when complete.

   **Note:** Partially remove the power supply module from the power supply cage. Do not completely remove the power supply module. **IMPORTANT**: When the power is on, wait several seconds before removing the power supply module completely from the power supply cage to ensure complete electrical discharge.
6. Disconnect the power supply cables from the I/O card, media bay backplane, and hard disk.
7. Unfasten the cable clamp that holds the power and IDE cables in place. The cable clamp is located under the top cover of the platform base chassis.
8. Run all cables to the rear, exterior of the platform base chassis.
9. Remove the four power supply chassis screws from the rear of the platform base chassis (see Figure 157). Place the screws in a safe location.

**Figure 157** Remove the BCM400 redundant power supply chassis screws



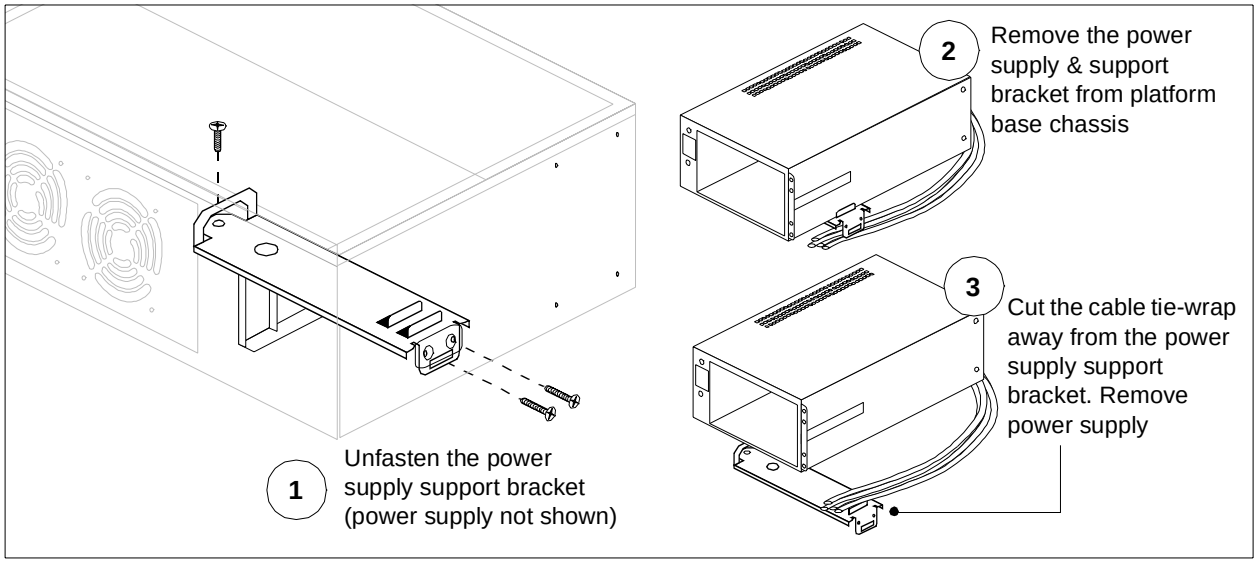

**10** Unfasten the exterior and interior power supply support bracket mounting screws (see Figure 145). Place the screws in a safe location.

**11** Remove the redundant power supply cage and support bracket out and away from the BCM400 platform base chassis (see Figure 158). Place the power supply in a safe, clean and static-free location.

**Note:** Remove the power supply carefully. Ensure the power supply cables are not entangled or connected to any internal components.

**12** Cut the cable ties that hold the power cables to the power supply support bracket. Be careful not to cut or damage the cable insulation.

**Figure 158** Remove the redundant power supply cage and support bracket


2
Remove the power supply & support bracket from platform base chassis
3
Cut the cable tie-wrap away from the power supply support bracket. Remove power supply
1
Unfasten the power supply support bracket (power supply not shown)

**13** This procedure is complete.

## Install a power supply module

This procedure describes how to install power supply modules in the power supply cage. After you install the redundant power supply cage in the platform base chassis, insert the two power supply modules.

Use this procedure also to replace faulty power supply modules. Redundant power supply modules can be exchanged while the system is running, as long as one of the modules remains active. This section is relevant only with the BCM400 platform base chassis..

**Note:** When you upgrade to a redundant power supply, you should also install a redundant fan. Refer to "Install a BCM400 cooling fan" on page 247.

**Warning:** Protect the hardware components against damage from electrostatic discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

1. Ensure you have the correct redundant power supply cage installed in the BCM400 platform base chassis (see Install a redundant power supply cage on page 272). Continue to the next step in this procedure when complete.
2. Ensure that you position the power supply modules correctly before inserting them into the power supply cage. The green LEDs are located at the top right of the power supply modules.
3. Insert the power supply modules into the redundant power supply cage at the rear of the platform base chassis.

**a** Push on the power supply module until the face of the module is flush with the casing. You hear a click when the power supply module is properly seated.

**b** Secure each module with the power supply locking nut (located on the right side of the module). Refer to Figure 159.

**Figure 159** Install the power supply modules into the power supply cage

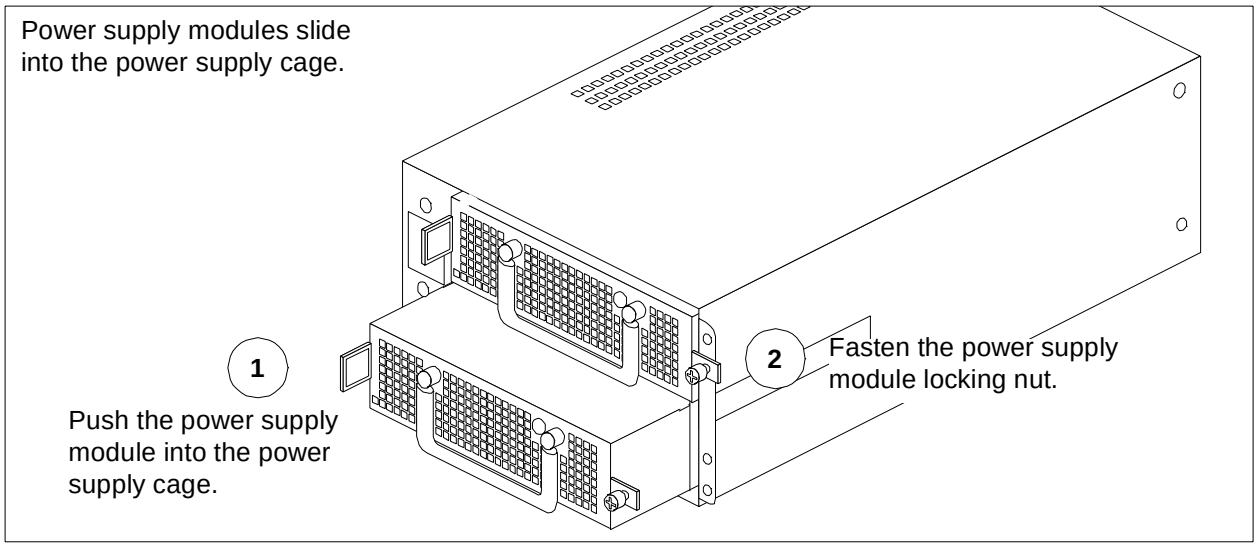
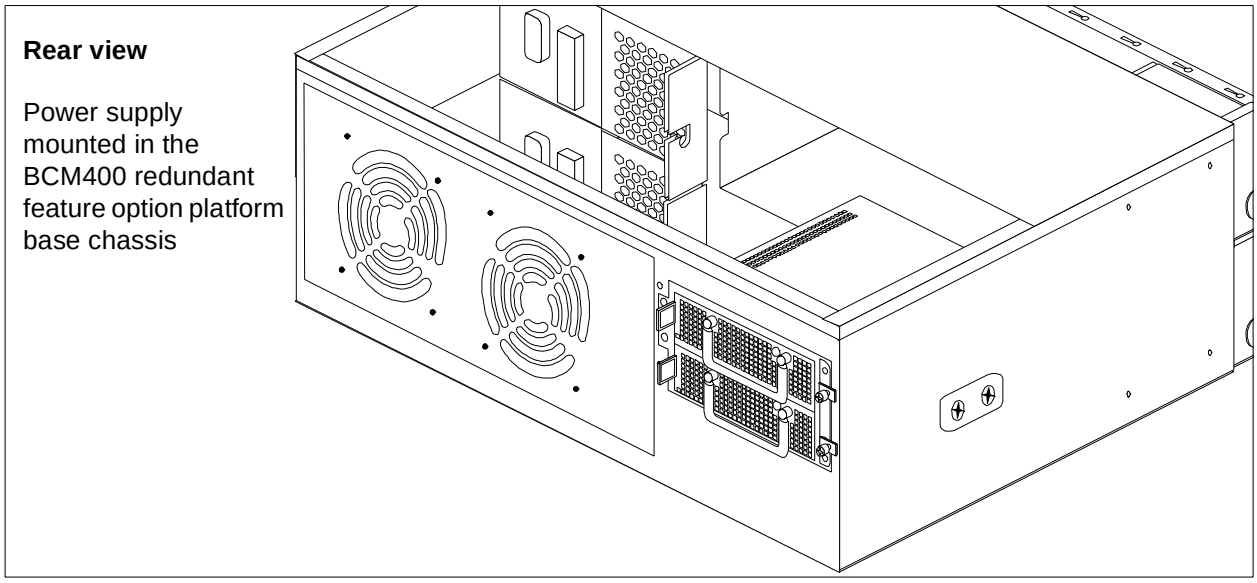

Power supply modules slide into the power supply cage.
1
Push the power supply module into the power supply cage.
2
Fasten the power supply module locking nut.

**Figure 160** BCM400 platform redundant power supply (rear view)




**4** If you are installing the redundant power supply for the first time, restore the Business Communications Manager to operation as described in "Restart the System after Maintenance" on page 197. Continue to the next step in this procedure when complete.

The Business Communications Manager system starts up when you connect the AC power cord. If the system does not start and the Red Power LED is on, you may need to press the reset button on the base function tray panel to start the system.

If you are replacing a single, faulty power supply module, the Business Communications Manager is already in operation. The replacement power supply module powers-up when fully and correctly inserted in the redundant power supply cage.

5 Verify the LEDs on the power supply module are lit. Verify all LEDs on the base function tray indicate the system functions correctly.

6 This procedure is complete.

## Remove a power supply module

Use this procedure for any of the following conditions:

- Remove a single failed power supply module. A power supply module indicates a failure when the green LED (located on the module) is not lit.
- Remove power supply modules before you install a new power supply cage in the BCM400 platform base chassis (see "Upgrade to a redundant power supply" on page 270).

**Note:** It is not necessary to remove power from the BCM400 platform base or expansion unit to replace a single power supply module.

**Warning:** Protect the hardware components against damage from electrostatic discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

**Warning:** Risk of shock.
Hazardous voltage levels are maintained for several seconds on removable modules. Do not completely remove the module from the power supply cage for several seconds after disengaging the module from the power supply cage.

1 Unfasten the power supply module locking nut. When the nut is fully unfastened, the nut should move freely in the screw cage.

2 Swing the power supply module handle to a 90 degree angle to the power supply module.

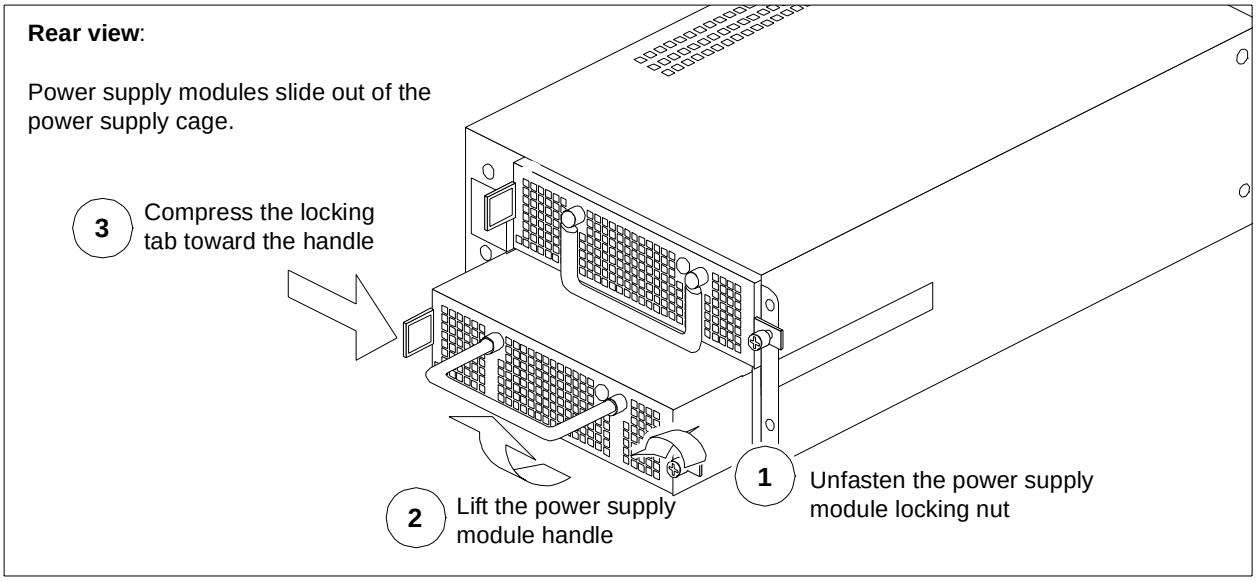
3 Grasp the power supply module handle. With your thumb, compress the locking tab toward the handle.

4 Pull the power supply module out of the power supply cage (see notes in this step).

**Note:** If you are replacing a faulty power supply module, power-down the power supply module. Partially remove the power supply module from the power supply cage. Do not completely remove the power supply module. **IMPORTANT**: When the power is on, wait several seconds before removing the power supply module completely from the power supply cage to ensure complete electrical discharge.

**Note:** If you are installing the redundant power supply for the first time, remove both power supply modules from the redundant power supply cage. Remove the power supply modules before you install the power supply in the platform base chassis (see Figure 161). Continue to Step 5 of this procedure.

**Figure 161** Remove the power supply module from the power supply cage


**Rear view**:
Power supply modules slide out of the power supply cage.
3
Compress the locking tab toward the handle
2
Lift the power supply module handle
1
Unfasten the power supply module locking nut

5 Place the power supply module on a flat, clean, static-free surface.

6 Repeat this step for any remaining power supply modules.

7 This procedure is complete.

# Chapter 10
# Replace Data Cards and Processing Hardware

This chapter describes how to replace data card and processing hardware components and provides the following primary topics:


- "System status LEDs" on page 283
- "Card Replacement Procedures" on page 283
- "Replace the Processor Expansion Card (PEC)" on page 303
- "Replace Memory" on page 308
- "Replace the Clock/Calendar Battery" on page 312


**Warning:** You must remove all of the connections to the Business Communications Manager before you power the system down.

Failure to disconnect lines before power down can cause damage to the system.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

The following are field replaceable units (FRUs) for the BCM200 and BCM400 platforms:

- Base function tray
- Cards (WAN, MSC, Modem)
- Computer memory
- PEC cards
- Main card CMOS battery

## System status LEDs

Ten LEDs on the front of the Business Communications Manager base function tray indicate PCI card and hardware status.Use the LEDs to determine PCI device status as follows:

- **Green LED on**: Device is present and the driver is active
- **Green LED flashing**: Driver is not running
- **Green LED off**: Device is not present

## Card Replacement Procedures

For a description of the function of each type of card on the Business Communications Manager system, refer to "Data networking components" on page 62. The base function tray (BFT) contains all of the cards described by the replacement procedures.

Use the procedures in this section to perform the following:


- "Remove the WAN card" on page 285
- "Install the WAN card" on page 287
- "Initialize a new WAN card" on page 289
- "Remove the media services card (MSC)" on page 292
- "Install the media services card (MSC)" on page 294
- "Remove the modem card" on page 297
- "Install the modem card" on page 300


**Danger:** Electrical shock warning.
Disconnect the power cord, telephone cables and network cables before opening the computer.
Read and follow installation instructions carefully.

**Caution:** Use only a Nortel Networks approved replacement. Contact your account representative for the current list of approved replacement parts.

Figure 162 shows an interior view of the base function tray (looking forward). The illustration identifies the location of interior components and chassis features. Use the flow chart shown in Figure 163 to replace the cards.

**Figure 162** Base function tray interior components

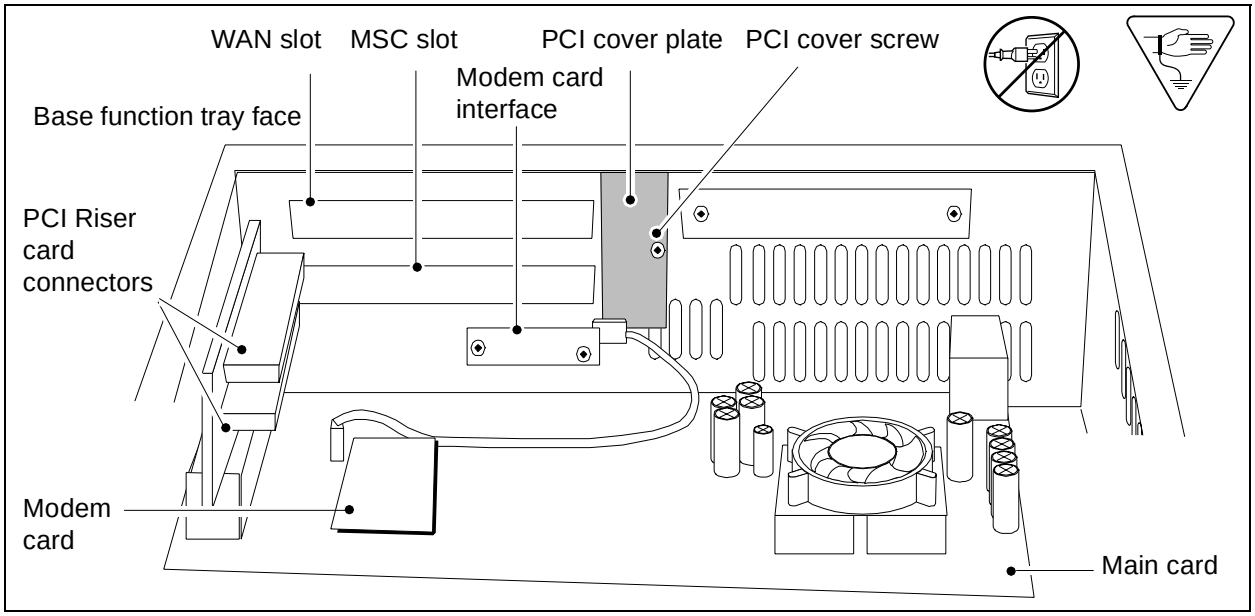
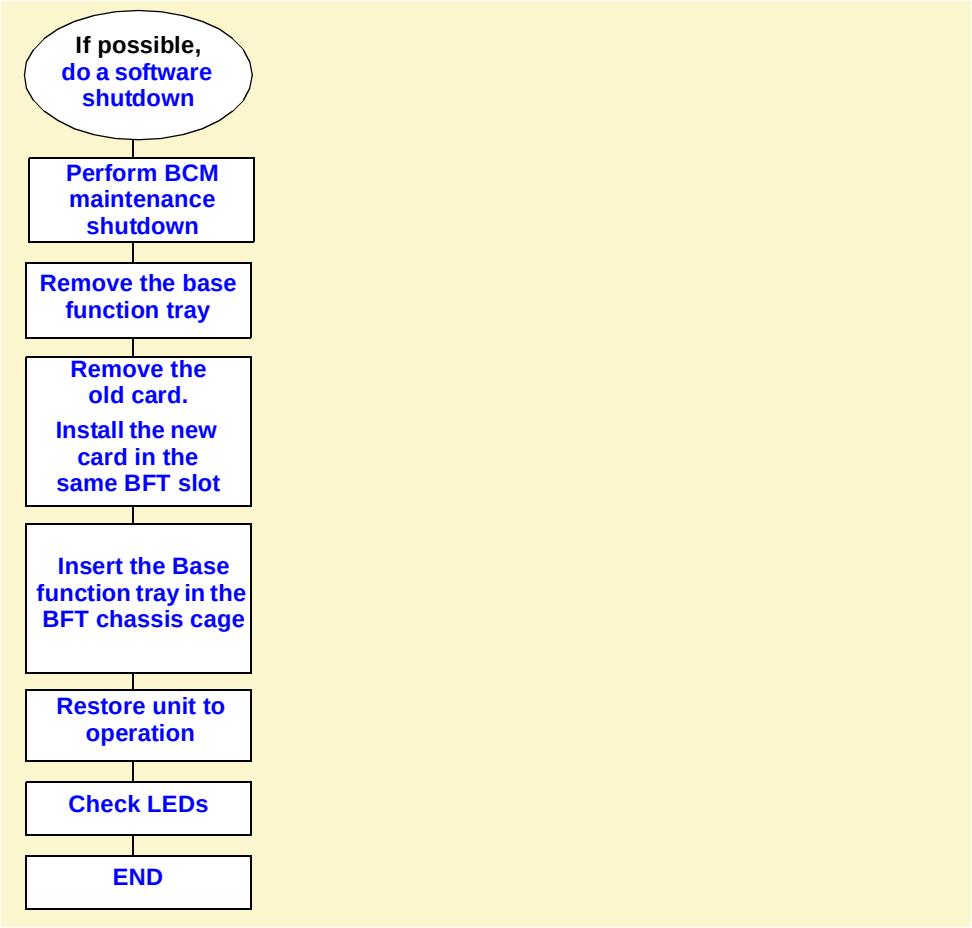


**Figure 163** Card replacement overview


If possible, do a software shutdown
Perform BCM maintenance shutdown
Remove the base function tray
Remove the old card.
Install the new card in the same BFT slot
Insert the Base function tray in the BFT chassis cage
Restore unit to operation
Check LEDs
END

## Remove the WAN card

Use this procedure to remove the WAN card.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

1. If you still have access to the Unified Manager, shut down the system using the Shutdown command. For details refer to "Shut down the system software" on page 195. Otherwise, skip to step 2.
2. Set up the server for maintenance, as described in "Shut down the system hardware" on page 196.
3. Disconnect the Business Communications Manager from the AC power outlet.
4. Disconnect any connectors from the front of the base function tray.

5 Remove the platform base chassis top cover. Refer to “Remove the platform base chassis top cover” on page 211.

6 Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.

7 Partially remove the base function tray from the platform base chassis. Ensure you do not pinch, stretch or damage any cables. If required, remove the base function tray completely from the platform base chassis (see “Remove the base function tray” on page 200).

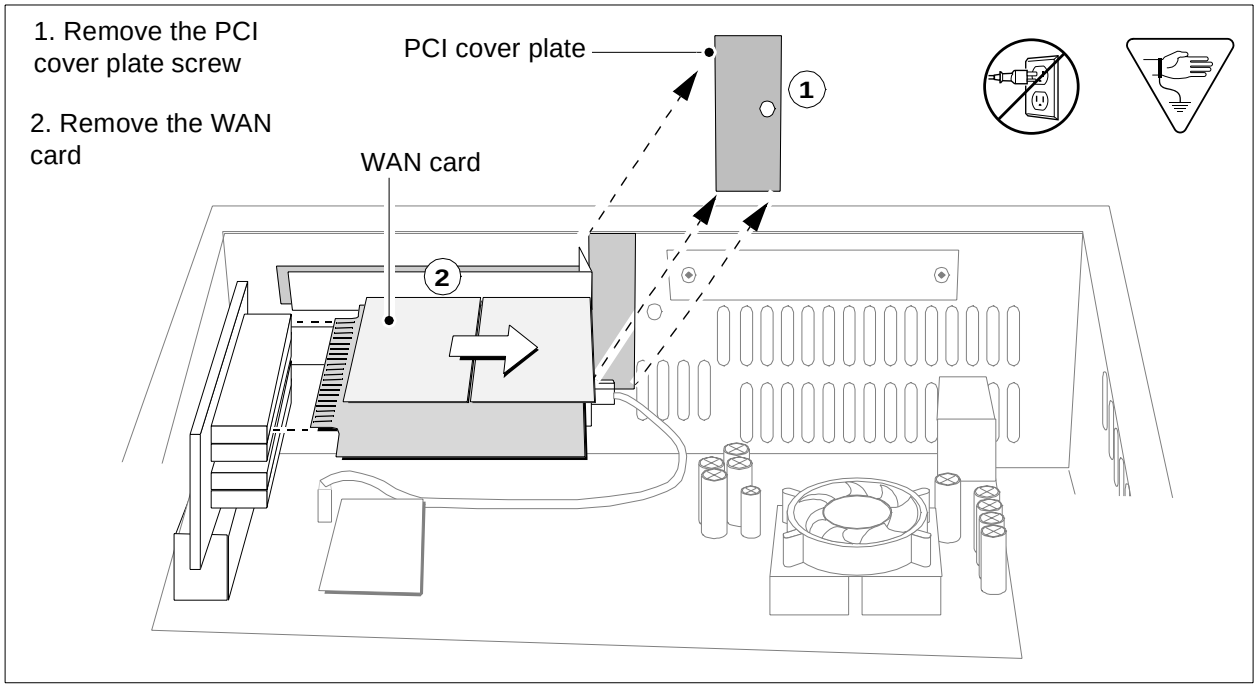
8 Remove the base function tray bezel. See “Remove the base function tray bezel” on page 203.

9 At the front of the base function tray, loosen and remove the PCI cover plate screw (use a #2 Phillips screwdriver). Figure 164 shows an interior view of the base function tray. Place the screw in a safe location.

10 Remove the PCI cover plate from the BFT chassis. Place the PCI cover plate in a safe location.

11 Use both hands to carefully hold the WAN card along the side edges. Push the WAN card away from the PCI riser card connector.

**Figure 164** Remove the WAN card and PCI cover plate




12 Remove the WAN card from the base function tray. Place the card in a safe, static-free and clean location or container.

13 This procedure is complete.

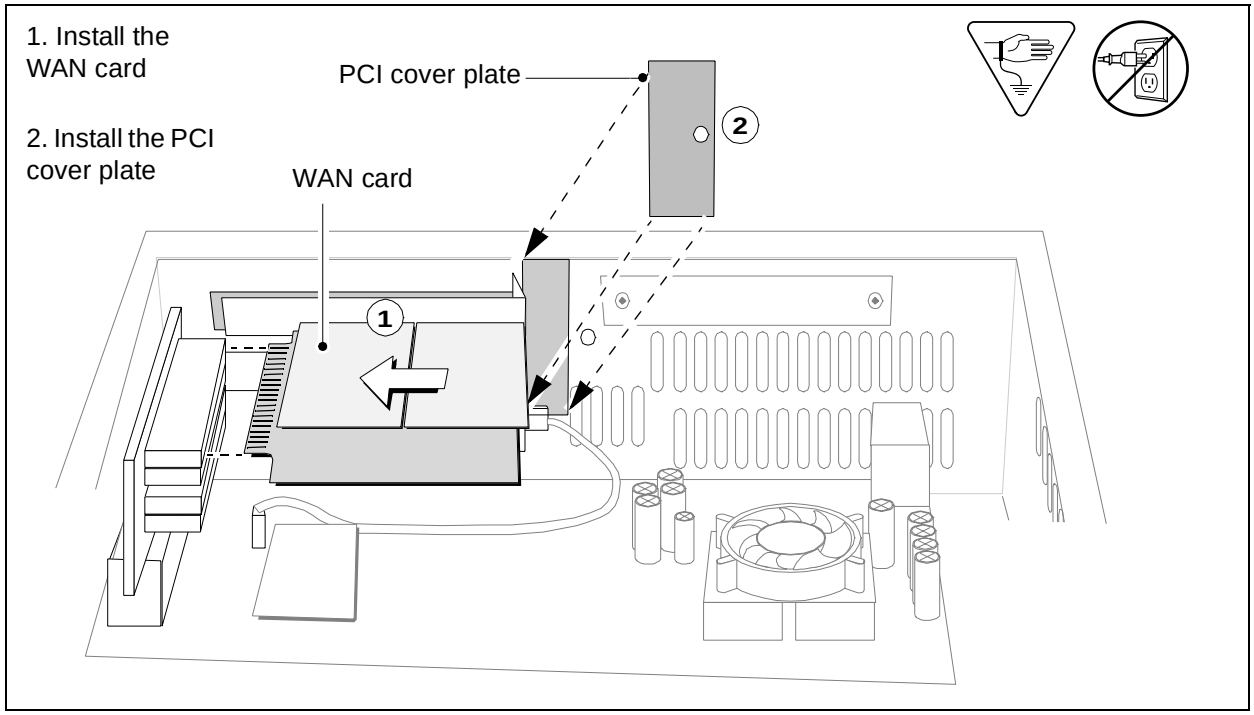
## Install the WAN card

Use this procedure to install a replacement WAN card. If you are installing a new WAN card for the first time, refer to “Initialize a new WAN card” on page 289.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

1. Disconnect the Business Communications Manager from the AC power outlet.
2. Partially remove the base function tray from the platform base chassis. If required, remove the base function tray completely from the platform base chassis (see “Remove the base function tray” on page 200).
3. Remove the base function tray bezel (if applicable).
4. Insert the WAN card in the same PCI slot from which you removed the original card. Refer to Figure 165.
5. Push firmly on the WAN card until it sits completely in the top PCI riser card connector.
6. Position the PCI cover plate on the front of the base function tray such that the base function tray and cover plate screw holes align.
7. Position the PCI cover plate locking screw in the PCI cover plate. Tighten the PCI cover plate locking screw until the plate is firmly set in place (see Figure 165).

**Figure 165** Install the WAN card



8 Partially insert the base function tray in the platform base chassis (see “Install the base function tray” on page 201). Ensure you do not pinch or damage any cables.

9 Install the base function tray bezel. See “Install the base function tray bezel” on page 204.

10 Move the base function tray latches to the locked position and install the latch screws.

11 Insert all connectors in the correct locations on the base function tray face.

12 Restore the unit to operation. For details, refer to “Restart the System after Maintenance” on page 197.

13 This procedure is complete.

## Initialize a new WAN card

Use this procedure to configure the Business Communications Manager to recognize a new WAN card installation.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

1. If you still have access to the Unified Manager, shut down the system using the Shutdown command. For details refer to "Shut down the system software" on page 195. Otherwise, skip to step 2.
2. Perform the WAN card installation as described in the procedure: "Install the WAN card" on page 287. Wait for the system to power-up. Continue to the next step of this procedure when complete.
3. Access the Business Communications Manager using one of the following methods:
   a. If using a terminal emulation program (Hyperterm), attach a configuration computer to the base function tray serial port (recommended method). Continue to the next step in this procedure when complete.
   b. If you are accessing the Business Communications Manager through your local area network through SSH (secure socket shell), use the default IP address 10.10.10.1. Continue to the next step in this procedure when complete.
4. Log onto the Business Communications Manager to display the configuration menu (see Figure 166 on page 290). See "Display the configuration menus" on page 188. Continue to the next step in this procedure when complete.
5. Select option 1 from the configuration main menu to display the Platform Initialization Menu (see Figure 167 on page 290).

**Figure 166** Configuration main menu

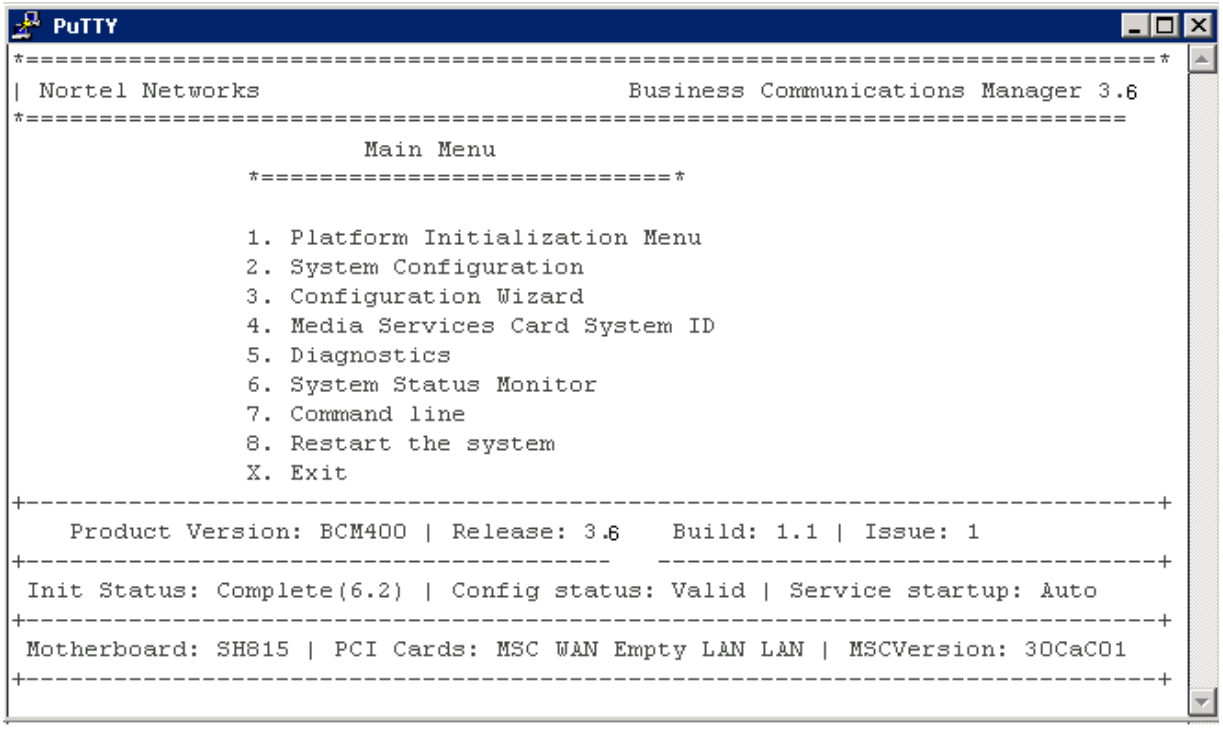
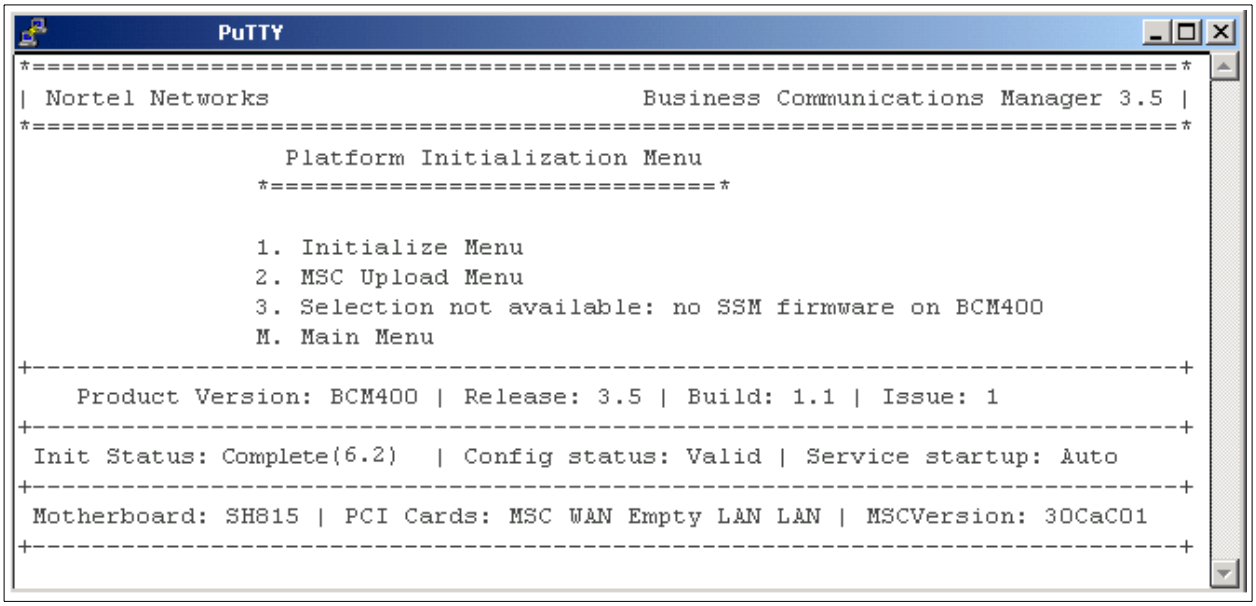
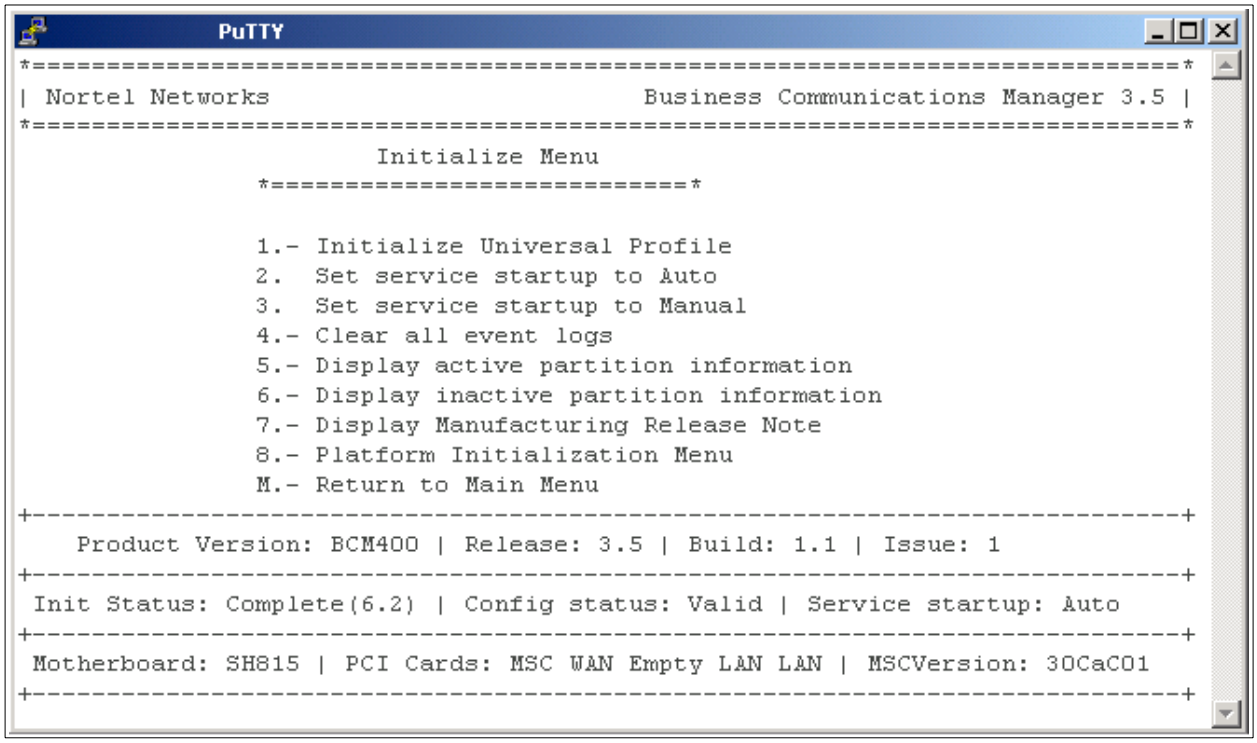

PuTTY
| Nortel Networks Business Communications Manager 3.6
Main Menu
1. Platform Initialization Menu
2. System Configuration
3. Configuration Wizard
4. Media Services Card System ID
5. Diagnostics
6. System Status Monitor
7. Command line
8. Restart the system
X. Exit
Product Version: BCM400 | Release: 3.6 Build: 1.1 | Issue: 1
Init Status: Complete(6.2) | Config status: Valid | Service startup: Auto
Motherboard: SH815 | PCI Cards: MSC WAN Empty LAN LAN | MSCVersion: 30CaC01

**Figure 167** Platform initialization menu


PuTTY
| Nortel Networks Business Communications Manager 3.5 |
Platform Initialization Menu
1. Initialize Menu
2. MSC Upload Menu
3. Selection not available: no SSM firmware on BCM400
M. Main Menu
Product Version: BCM400 | Release: 3.5 | Build: 1.1 | Issue: 1
Init Status: Complete(6.2) | Config status: Valid | Service startup: Auto
Motherboard: SH815 | PCI Cards: MSC WAN Empty LAN LAN | MSCVersion: 30CaC01

**6** Select option 1 - Initialize Menu from the Platform Initialization menu to display the Initialize menu (see Figure 168). The WAN card is shown in the PCI card inventory.

**Figure 168** Initialize menu


PuTTY
| Nortel Networks Business Communications Manager 3.5 |
Initialize Menu
1.- Initialize Universal Profile
2. Set service startup to Auto
3. Set service startup to Manual
4.- Clear all event logs
5.- Display active partition information
6.- Display inactive partition information
7.- Display Manufacturing Release Note
8.- Platform Initialization Menu
M.- Return to Main Menu
Product Version: BCM400 | Release: 3.5 | Build: 1.1 | Issue: 1
Init Status: Complete(6.2) | Config status: Valid | Service startup: Auto
Motherboard: SH815 | PCI Cards: MSC WAN Empty LAN LAN | MSCVersion: 30CaC01

7 Select option 1 - Initialize Universal Profile from the Initialize menu. The Business Communications Manager performs a shutdown and reboots to enable the WAN card. This process takes a several minutes to complete.

8 Observe the SSM LEDs on the BCM faceplate to determine when the system reboot process is complete. When the reboot process is complete, the SSH session terminates and the WAN card is initialized.

9 This procedure is complete.

## Remove the media services card (MSC)

Use this procedure to remove the media services card from the base function tray.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

**Note:** If you purchased optional Business Communications Manager applications that require keycode activation, regenerate the keycodes after you install the replacement MSC. For further information, see “Regenerating keycodes after system replacement” on page 192 and “Install the media services card (MSC)” on page 294.

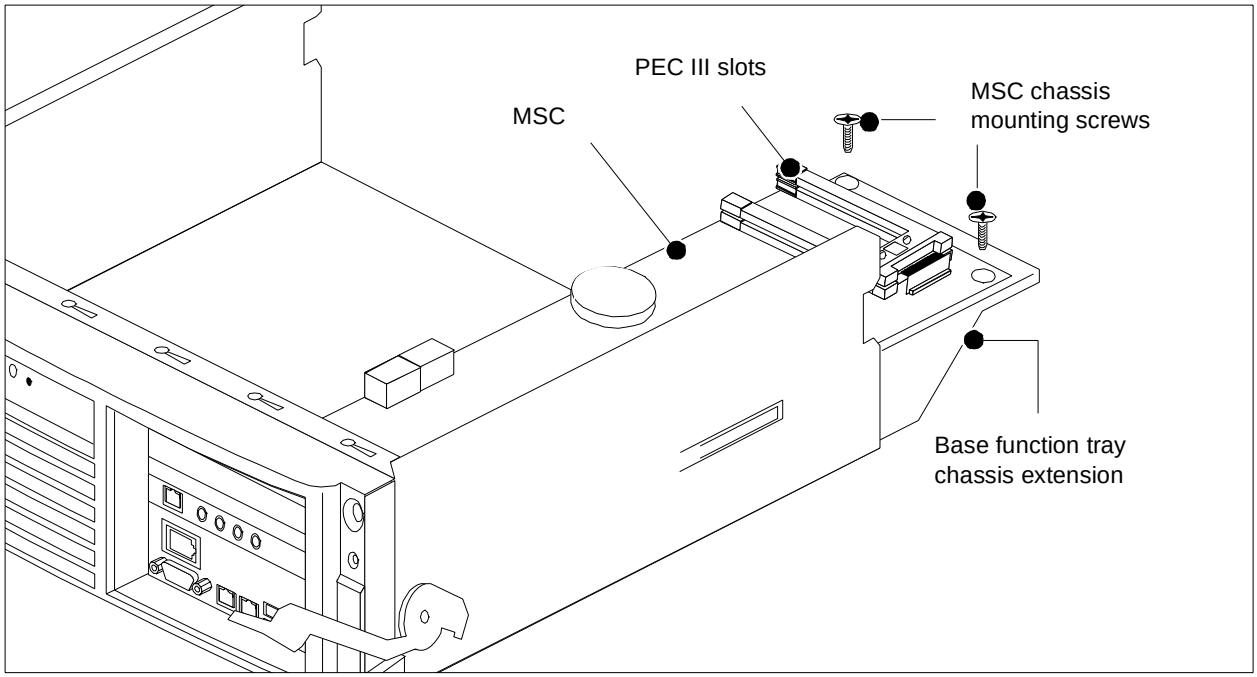
**Note:** If you need to install a new MSC, you must upload new core software from the hard disk. See “Install the media services card (MSC)” on page 294.

1. Ensure you have a current data backup of your system (see “Use the Backup and Restore Utility” on page 215).
2. If you still have access to the Unified Manager, shut down the system using the Shutdown command. For details refer to “Shut down the system software” on page 195. Otherwise, skip to step 3.
3. Set up the server for maintenance, as described in “Shut down the system hardware” on page 196. Continue to the next step of this procedure when complete.
4. Disconnect the Business Communications Manager from the AC power outlet.
5. Disconnect any cables from the front of the base function tray.
6. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
7. Partially remove the base function tray from the platform base chassis (See “Remove the base function tray” on page 200). Do not exert force on the DS30 cables and connectors. Continue to the next step of this procedure when complete.
8. Disconnect the DS30 cables from the MSC.
9. Remove the base function tray completely from the platform base chassis. Ensure you do not pinch or damage any cables (see See “Remove the base function tray” on page 200). Place the base function tray on a flat, clean and static-free surface. Continue to the next step of this procedure when complete.
10. Remove the base function tray bezel. See “Remove the base function tray bezel” on page 203. Continue to the next step of this procedure when complete.
11. At the front of the base function tray, loosen and remove the PCI cover plate screw (use a #2 Phillips screwdriver). Figure 164 shows an interior view of the base function tray. Place the screw in a safe location.

**12** Remove the PCI cover plate from the base function tray chassis. Place the PCI cover plate in a safe location.

**13** Remove the two chassis mounting screws that secure the MSC to the base function tray chassis extension (at the rear of the MSC) - see Figure 169. Place the screws in a safe location.

**Figure 169** MSC chassis mounting screws




**14** Use both hands to carefully hold the card along the side edges. Push the card away from the PCI riser card connector to disconnect the MSC.

**15** Remove the MSC from the base function tray. Place the MSC on a flat, clean and static-free surface.

**16** Remove all processor expansion cards (PEC IIIs) from the MSC (see the procedure “Remove the processor expansion card (PEC)” on page 304). Place the PEC IIIs in a safe, static-free location. Re-use the cards in a replacement MSC (see the procedure: “Install the media services card (MSC)” on page 294). Continue to the next step in this procedure when complete.

**17** This procedure is complete.

## Install the media services card (MSC)

Use this procedure to install the media services card in the base function tray.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

**Note:** If you purchased optional Business Communications Manager applications that require keycode activation, regenerate the keycodes after you install the replacement MSC. For further information, see “Regenerating keycodes after system replacement” on page 192.

**Note:** If you need to install a new MSC, you must upload core software from the hard disk. If you re-install the same MSC, the core software on the MSC is the most current variant and no core software upload is necessary.

1. Disconnect the Business Communications Manager from the wall power outlet.
2. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
3. Install the processor expansion cards (PEC IIIs) in the MSC. Refer to the procedure: “Install a processor expansion card (PEC)” on page 306. Continue to the next step in this procedure when complete.
4. Position the MSC in the correct PCI riser card connector.
5. Push the card firmly and fully into the PCI riser card connector. Ensure the lanclet tab on MSC PCI bracket aligns correctly with the lanclet slot on the base function tray chassis.
6. Install the two chassis mounting screws at the rear of the MSC (see Figure 169).
7. Position the PCI cover plate on the front of the base function tray such that the base function tray and cover plate screw holes align.
8. Position the PCI cover plate locking screw in the PCI cover plate. Tighten the PCI cover plate locking screw until the plate is firmly set in place (see Figure 165).
9. Install the base function tray bezel. See “Install the base function tray bezel” on page 204. Continue to the next step in this procedure when complete.
10. Partially install the base function tray in the platform base chassis.
11. Connect the DS30 connectors to the MSC.
12. Install the base function tray completely into the chassis. Be careful not to crimp the DS30 cables. (See “Install the base function tray” on page 201. Continue to the next step in this procedure when complete.
13. Insert all connectors in the correct locations on the base function tray face.

**14** Restore the Business Communications Manager to operation. For details, refer to "Restart the System after Maintenance" on page 197.

**Note:** If the MSC is new, upload the core software from the hard disk to the MSC. Refer to Steps 15 - 24.

If you removed and re-installed the same MSC (for example, to replace the battery on the main card), you do not need to upload core software from the hard disk - continue to Step 25 of this procedure.

**15** Ensure the **Status** LED on the Business Communications Manager is lit. The **Status** LED indicates that all services have started and the Business Communications Manager is operating correctly.

**16** Access the Business Communications Manager through a configuration computer.

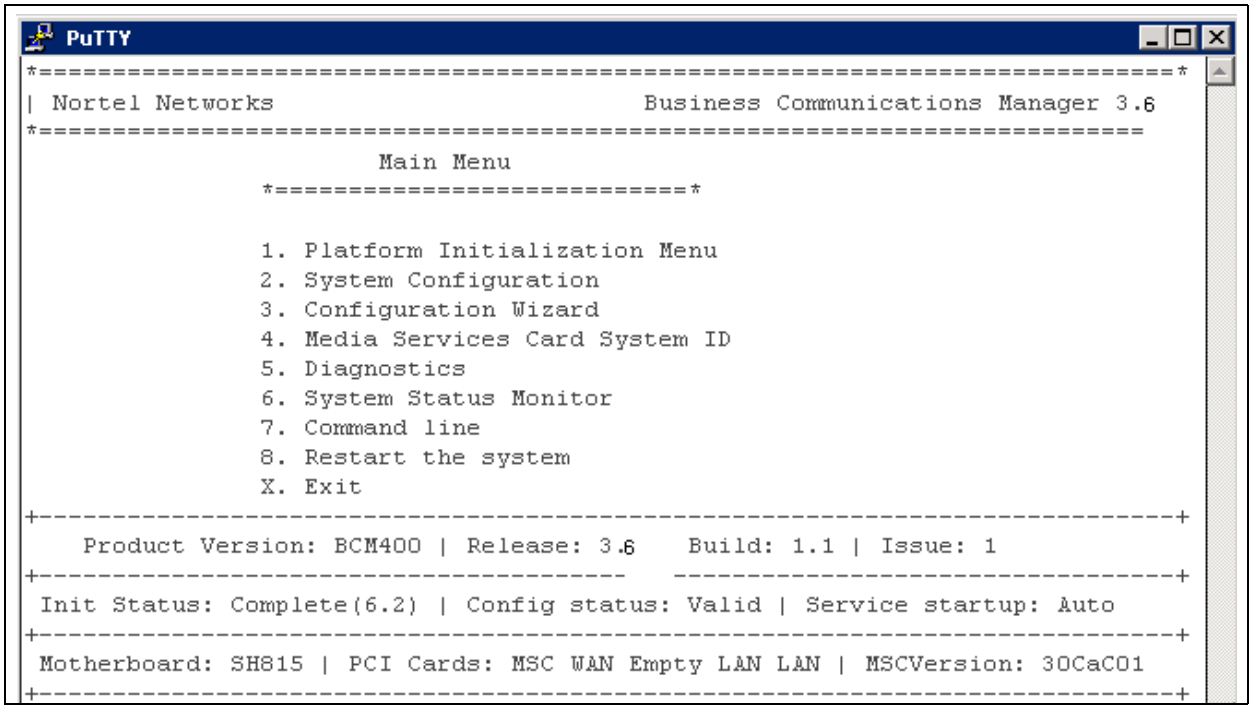
**17** Access the Business Communications Manager (see also "Display the configuration menus" on page 188) using one of the following methods:

**a** If using a terminal emulation program (Hyperterm), attach a configuration computer to the base function tray serial port (recommended method). Continue to the next step in this procedure when complete.

**b** If you are accessing the Business Communications Manager through your local area network through SSH (secure socket shell), use the default IP address 10.10.10.1. Continue to the next step in this procedure when complete.

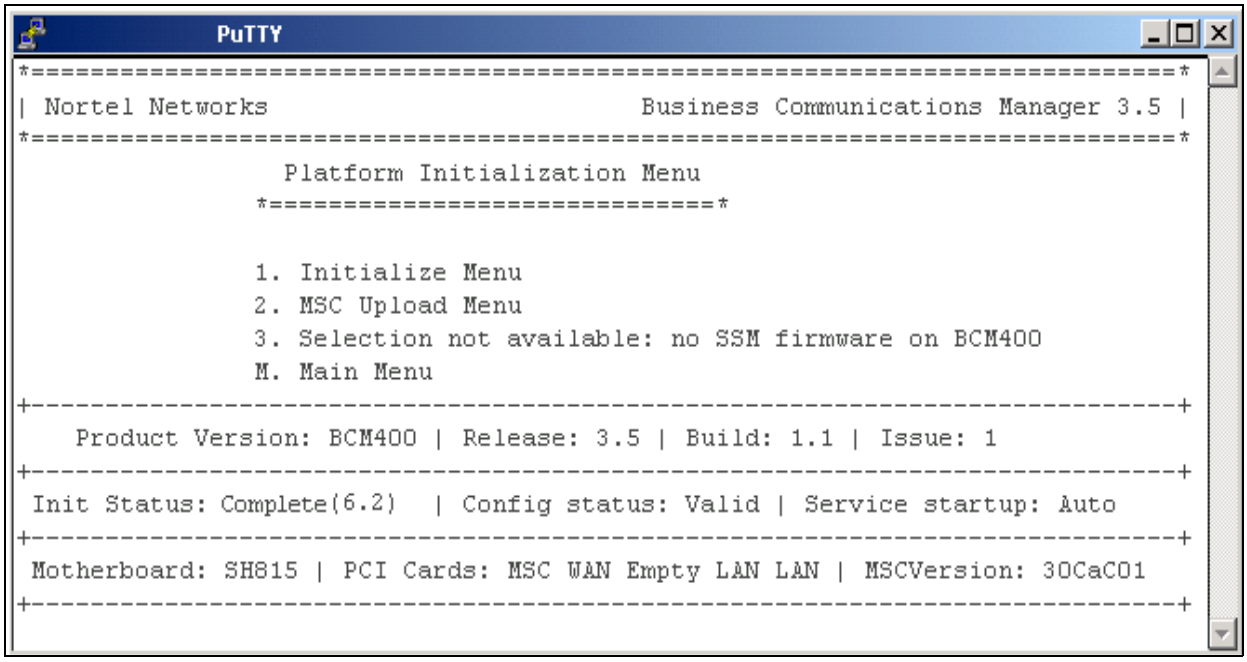
**18** Log onto the Business Communications Manager to display the configuration menu screen (see Figure 170 on page 295). Continue to the next step in this procedure when complete.

**Figure 170** Configuration main menu screen


PuTTY
*==========*
| Nortel Networks Business Communications Manager 3.6
*==========*
Main Menu
*==========*
1. Platform Initialization Menu
2. System Configuration
3. Configuration Wizard
4. Media Services Card System ID
5. Diagnostics
6. System Status Monitor
7. Command line
8. Restart the system
X. Exit
Product Version: BCM400 | Release: 3.6 Build: 1.1 | Issue: 1
Init Status: Complete(6.2) | Config status: Valid | Service startup: Auto
Motherboard: SH815 | PCI Cards: MSC WAN Empty LAN LAN | MSCVersion: 30CaC01

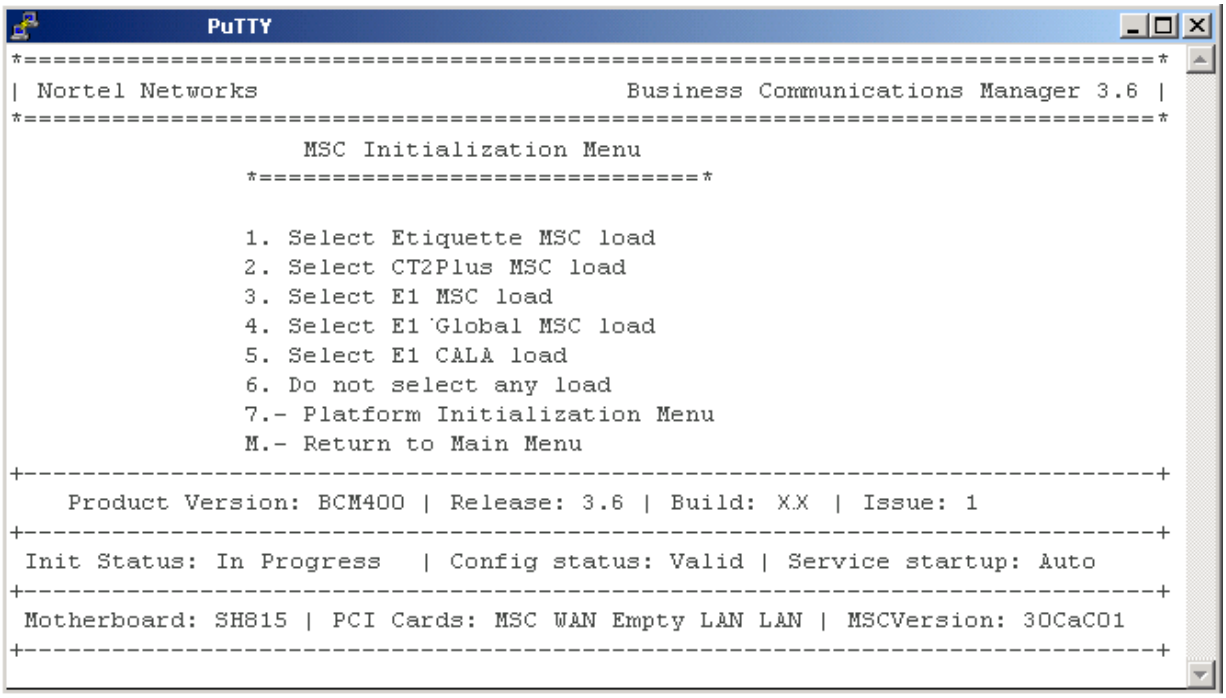
**19** Select option 1 - Platform Initialization Menu from the configuration main menu to display the Platform Initialization Menu screen (see Figure 171 on page 296).

**Figure 171** Platform Initialization Menu screen


PuTTY
| Nortel Networks Business Communications Manager 3.5 |
Platform Initialization Menu
1. Initialize Menu
2. MSC Upload Menu
3. Selection not available: no SSM firmware on BCM400
M. Main Menu
Product Version: BCM400 | Release: 3.5 | Build: 1.1 | Issue: 1
Init Status: Complete(6.2) | Config status: Valid | Service startup: Auto
Motherboard: SH815 | PCI Cards: MSC WAN Empty LAN LAN | MSCVersion: 30CaC01

**20** Select option 2 - MSC Upload Menu from the platform initialization menu to display the MSC upload menu screen (see Figure 172 on page 296).

**Figure 172** MSC Upload (Initialization) menu screen


PuTTY
| Nortel Networks Business Communications Manager 3.6 |
MSC Initialization Menu
1. Select Etiquette MSC load
2. Select CT2Plus MSC load
3. Select E1 MSC load
4. Select E1 Global MSC load
5. Select E1 CALA load
6. Do not select any load
7.- Platform Initialization Menu
M.- Return to Main Menu
Product Version: BCM400 | Release: 3.6 | Build: XX | Issue: 1
Init Status: In Progress | Config status: Valid | Service startup: Auto
Motherboard: SH815 | PCI Cards: MSC WAN Empty LAN LAN | MSCVersion: 30CaC01

21 From the list of core software options in the MSC upload menu, choose the core software option appropriate to your region (see “Regional core software” on page 398). The system executes the upload process.

22 The core software upload process takes several minutes to complete. A message appears on screen to prompt you to press any key. Press any key to display the Platform Initialization Menu screen.

23 Restore your telephony data from your backup data using the backup and restore uitility (see “Use the Backup and Restore Utility” on page 215). Continue to the next step in this procedure when complete.

24 Restore your Business Communication Manager application keycodes if applicable. The step applies only if you installed a new MSC. See “Regenerating keycodes after system replacement” on page 192.

25 This procedure is complete.

## Remove the modem card

Use this procedure to remove the modem card from the main card in the base function tray.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

1 If you still have access to the Unified Manager, shut down the system using the Shutdown command. For details refer to “Shut down the system software” on page 195. Otherwise, skip to step 2.

2 Set up the Business Communications Manager for maintenance, as described in “Shut down the system hardware” on page 196.

3 Disconnect the Business Communications Manager from the AC power outlet.

4 Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.

5 Remove the platform base chassis top. Refer to “Remove the platform base chassis top cover” on page 211. Continue to the next step of this procedure when complete.

6 Disconnect any connectors from the front of the base function tray.

7 Partially remove the base function tray from the platform base chassis (“Remove the base function tray” on page 200). Do not exert force on the DS30 cables and connectors. Ensure you do not pinch, stretch or damage any cables.

8 Disconnect the DS30 cables from the MSC.

9 Remove the base function tray completely from the platform base chassis. Ensure you do not pinch, stretch or damage any cables. Refer to “Remove the base function tray” on page 200. Place the base function tray on a flat, clean and static-free surface. Continue to the next step of this procedure when complete.

10 Remove the base function tray bezel. See “Remove the base function tray bezel” on page 203. Continue to the next step when complete.

11 Loosen and remove the PCI cover plate screw (use a #2 Phillips screwdriver - see Figure 164). Place the PCI cover plate screw in a safe location.

12 Remove the PCI cover plate from the base function tray chassis (see Figure 164 on page 286). Place the PCI cover plate in a safe location.

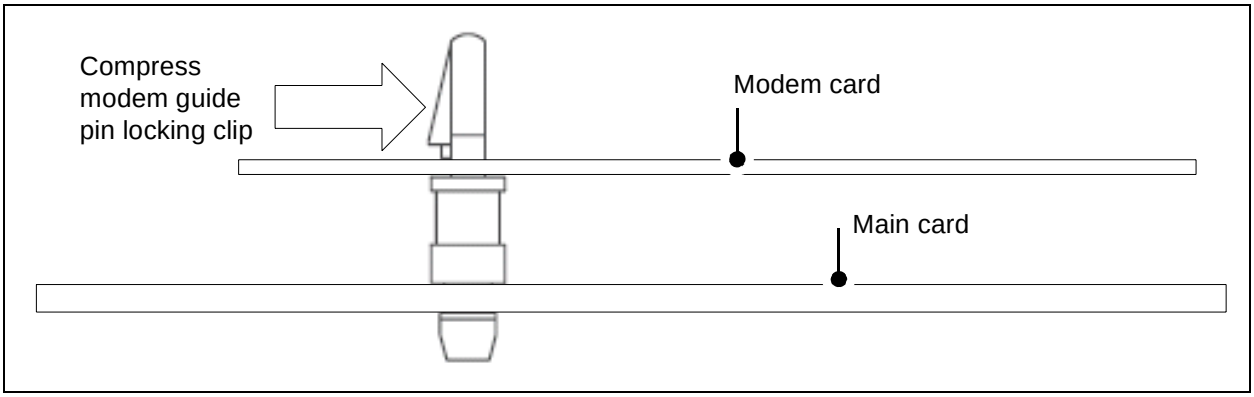
13 Remove the WAN card if applicable (see “Remove the WAN card” on page 285). Continue to the next step when complete.

14 Remove the MSC. Refer to “Remove the media services card (MSC)” on page 292. Continue to the next step of this procedure when complete.

15 Locate the modem card on the main card.

16 Compress the locking clip at the tip of the modem guide pin.

**Figure 173** Modem card

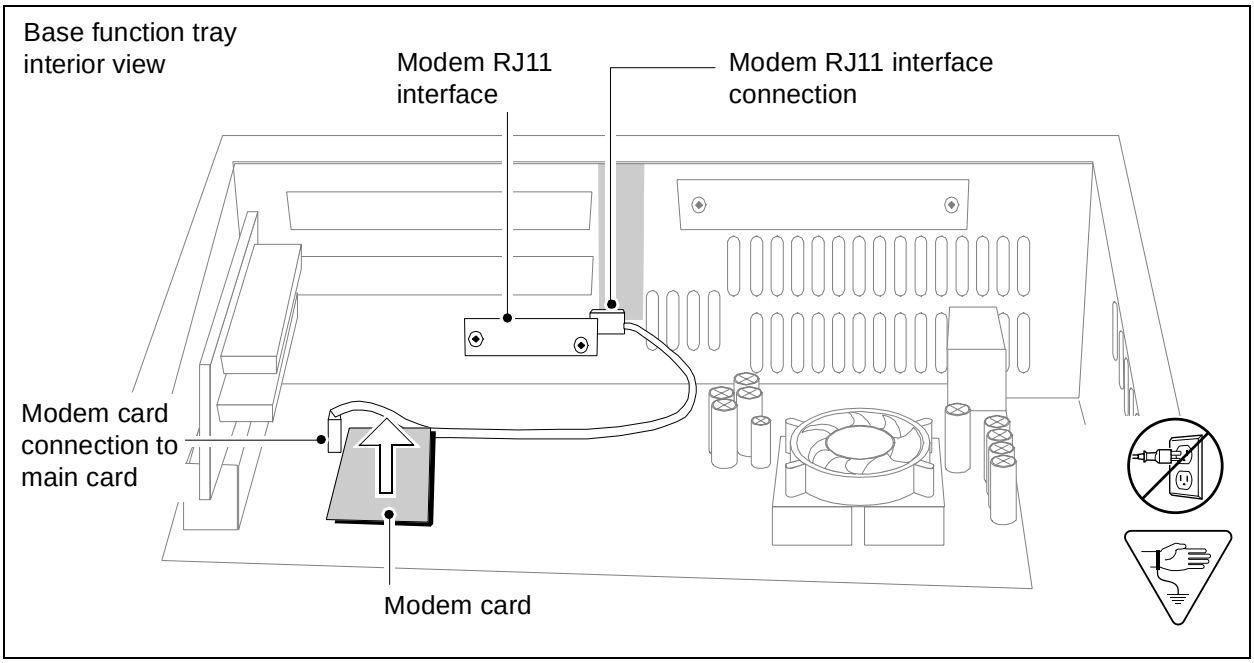



17 Grasp the modem card edges with your finger tips. Carefully pull the modem card away from the main card. Place the modem card in a clean, safe and static-free location.

18 Disconnect the modem cable from the main card and RJ11 interface.

19 Unfasten the modem RJ11 interface screws. Place the screws in a safe location.

**Figure 174** Modem card




**20** Unfasten the modem RJ11 interface mounting screws. Place the screws in a safe location.

**21** Remove the modem RJ11 interface from the base function tray chassis.

**22** Carefully grasp the modem card guide pin and remove. Place the pin in a safe location.

**23** This procedure is complete.

## Install the modem card

Use this procedure to install a modem card in a base function tray. This procedure assumes the base function tray is not installed in the platform base chassis.

**Note:** Before you power-down the system to remove the base function tray, confirm that the CallPilot region of operation information is correct

a. On the navigation tree, click the **System** key and click the **Identification** heading. The Identification screen appears.

b. Click the **CallPilot Region** box.

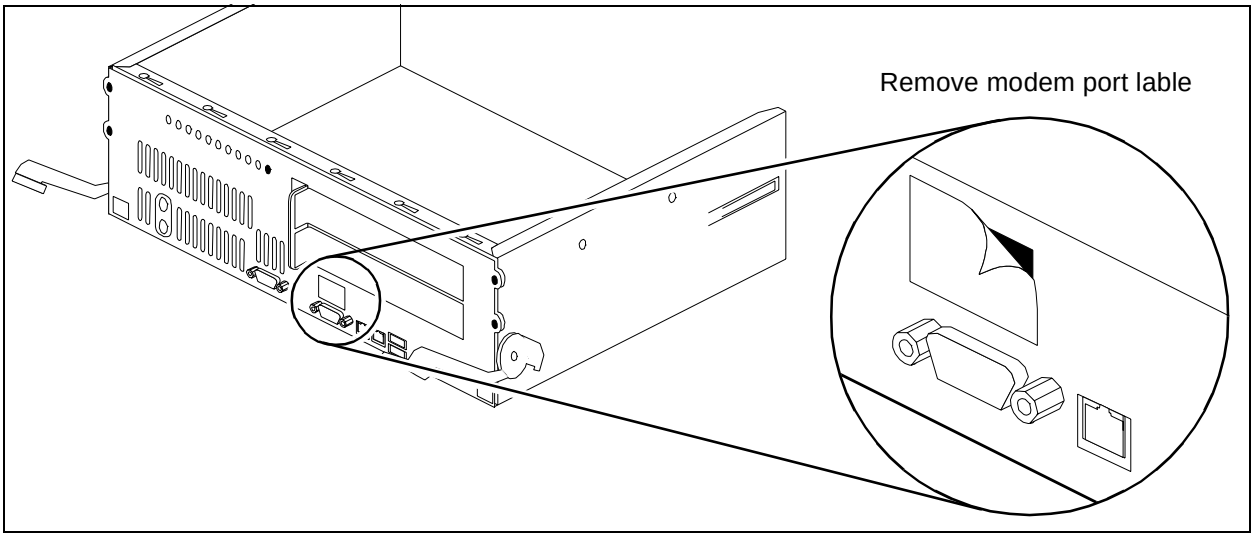
c. Click the region in which the Business Communications Manager system resides. If necessary, change the region.

d. Press the **Tab** key to save your information

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

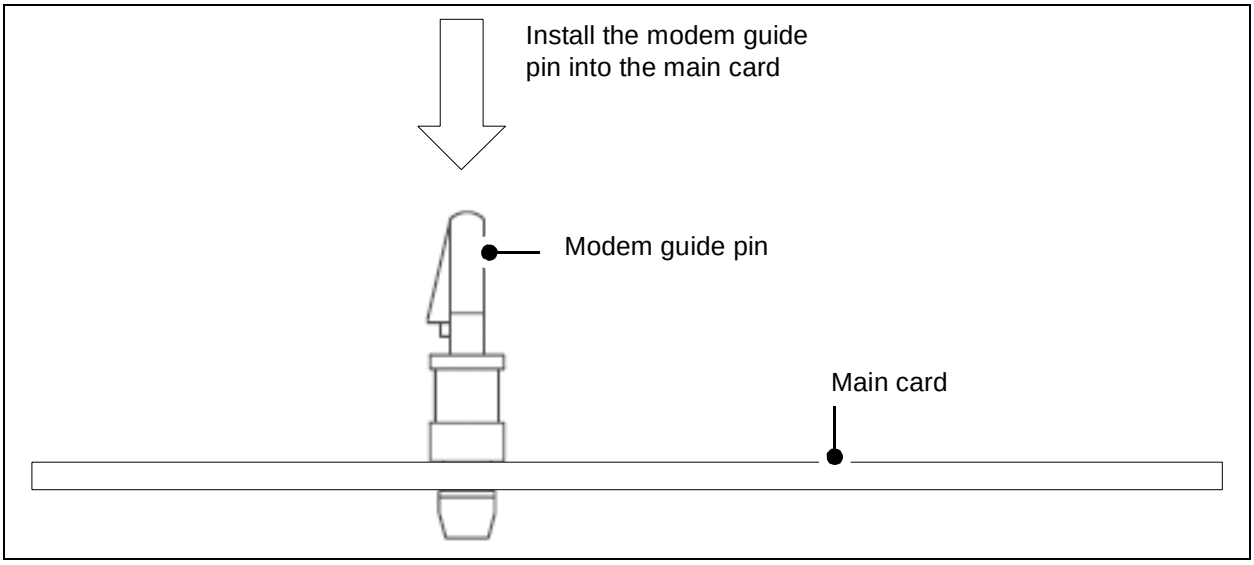
1. Obtain a correct and functional modem kit.
2. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
3. Remove the base function tray bezel. See "Remove the base function tray bezel" on page 203. Continue to the next step of this procedure when complete.
4. If required, remove the WAN card. See "Remove the WAN card" on page 285. Continue to the next step of this procedure when complete.
5. If required, remove the MSC card from the base function tray. See "Remove the media services card (MSC)" on page 292. Continue to the next step of this procedure when complete.
6. If you are installing the modem card for the first time, locate the modem port label on the front of the base function tray. Remove the modem port label if required and discard (see Figure 175).

**Figure 175** Modem port label




**7** If applicable, install the modem card guide pin on the main card. Ensure the modem card guide pin aligns with the correct opening on the main card (see Figure 176).

**Figure 176** Modem card guide pin installation




**8** Carefully grasp the modem card with your finger tips.

**9** Install the modem card in the correct location on the main card. Ensure the modem card pins correctly align with the main card modem connectors and modem guide pin.

**10** Gently push in a downward direction on the modem card with your fingertips. Ensure the modem card seats correctly in the main card modem connectors.

**11** If applicable, install the modem RJ11 interface to the base function tray faceplate. Ensure the modem RJ11 interface connector is on the right-hand side (as shown in Figure 174).

**12** If applicable, connect the RJ11 modem card connector to the main card socket and the RJ11 interface (see Figure 174).

13 Install the MSC in the correct PCI riser card connector. See “Install the media services card (MSC)” on page 294. When complete, continue to the next step of this procedure.

14 Install the two chassis mounting screws that secure the MSC to the base function tray chassis extension (at the rear of the MSC). See Figure 169.

15 Position the WAN card (if applicable) in the top PCI riser card connector. See “Install the WAN card” on page 287. When complete, continue to the next step of this procedure.

16 Partially install the base function tray in the platform base chassis.

17 Connect the DS30 connectors to the MSC.

18 Position the PCI cover plate on the front of the base function tray such that the base function tray and cover plate screw holes align.

19 Position the PCI cover plate locking screw in the PCI cover plate. Tighten the PCI cover plate locking screw until the plate is firmly set in place (see Figure 165).

20 Push the base function tray completely into the chassis (see “Install the base function tray” on page 201). Ensure you do not pinch or damage any cables. When complete, continue to the next step of this procedure.

21 Restore the Business Communications Manager to operation. For details, refer to “Restart the System after Maintenance” on page 197. When complete, continue to the next step of this procedure.

22 Re-initialize your system.

23 This procedure is complete.

# Replace the Processor Expansion Card (PEC)

This section describes how to replace the processor expansion card in the BCM200 and BCM400 platform base chassis. This section contains the following procedures:

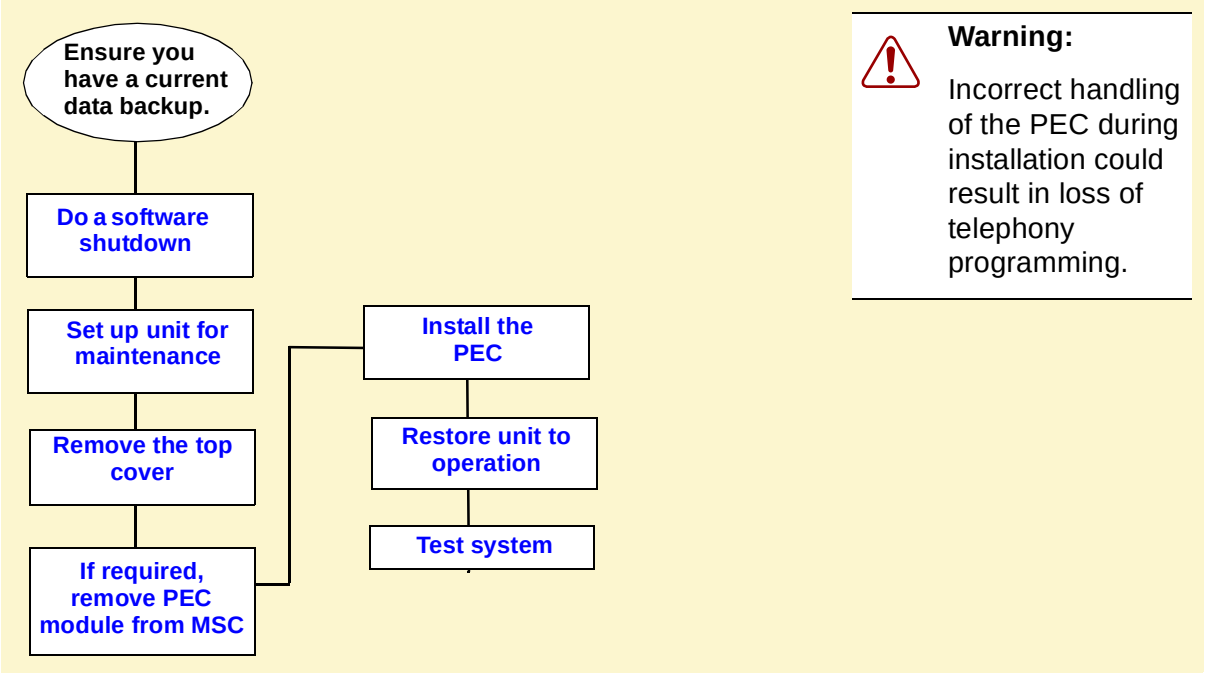

- "Remove the processor expansion card (PEC)" on page 304
- "Install a processor expansion card (PEC)" on page 306
- "Remove the dual in-line memory module (DIMM) card" on page 308


The BCM200 is equipped with one Processor expansion card (PEC III) mounted on the Media services card (MSC). The BCM400 is equipped with two Processor expansion cards (PEC III) mounted on the Media services card (MSC). The PECs provide signal processing capabilities for such applications as voice mail and IP telephony applications.

This section describes the processes to remove and replace a PEC module.

Figure 177 provides an overview of the process for replacing the PEC.

**Figure 177** PEC replacement overview


Ensure you have a current data backup.
Do a software shutdown
Set up unit for maintenance
Remove the top cover
If required, remove PEC module from MSC
Install the PEC
Restore unit to operation
Test system
Warning:
Incorrect handling of the PEC during installation could result in loss of telephony programming.

**Danger:** Electrical shock warning.
Disconnect the power cord, telephone cables and network cables before opening the computer.
Read and follow installation instructions carefully.

**Caution:** Use only a Nortel Networks approved replacement. Contact your account representative for the current list of approved replacement parts.

## Remove the processor expansion card (PEC)

Use this procedure to remove PECs from a Business Communications Manager MSC.

**Warning:** Possible data loss

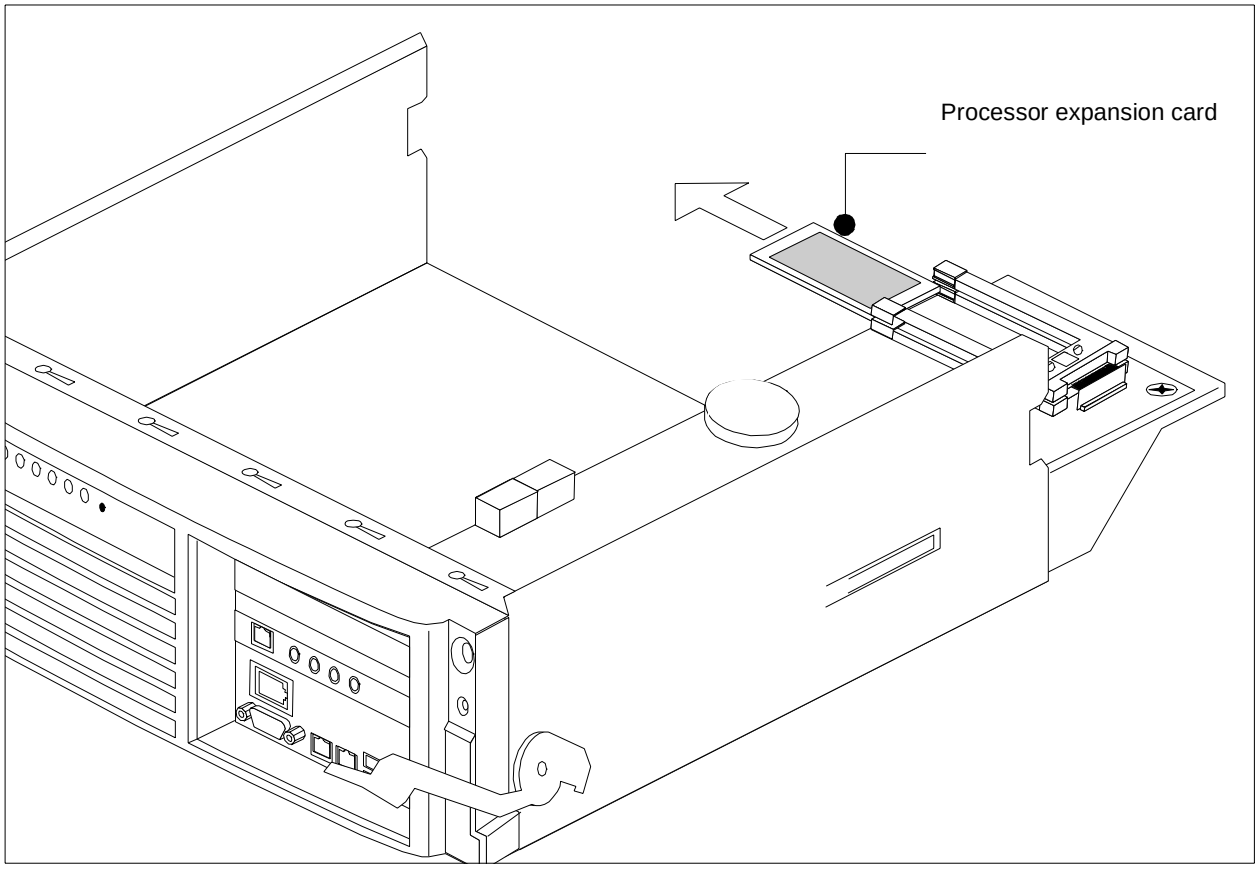
Ensure that you do not touch the PEC casing to any of the components on the MSC. This may cause shorting, which can erase memory or cause a loss of telephony programming.

If a loss of memory or telephony programming occurs, complete the removal of the PEC, and then restore the data from your backup medium (upon re-installation - see "Install a processor expansion card (PEC)" on page 306).

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

1. Ensure you have a current data backup of your system (see "Use the Backup and Restore Utility" on page 215).
2. Shut down the system using the Shutdown command. For details refer to "Shut down the system software" on page 195. Continue to the next step of this procedure when complete.
3. Set up the server for maintenance, as described in "Shut down the system hardware" on page 196. Continue to the next step of this procedure when complete.
4. Disconnect the Business Communications Manager from the wall power outlet.
5. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
6. Completely remove the base function tray from the platform base chassis (see "Remove the base function tray" on page 200). Ensure you do not pinch, stretch or damage any cables. Continue to the next step of this procedure when complete.
7. Grasp the top edge of the PEC you want to remove and it pull out. Place the PEC in a safe and static-free container. Refer to Figure 178.

**Figure 178** Remove the processor expansion card (PEC III)




**8** This procedure is complete.

## Install a processor expansion card (PEC)

When you replace or add PECs, ensure you follow the directions for shutting down the system. Ensure you have a current data backup of your system. This procedure assumes the base function tray is completely removed from the platform base chassis.

**Warning:** Possible data loss

Ensure that you do not touch the PEC casing to any of the components on the MSC. This may cause shorting, which can erase memory or cause a loss of telephony programming.

If this occurs, complete the installation of the PEC, and then restore the data from your backup medium.

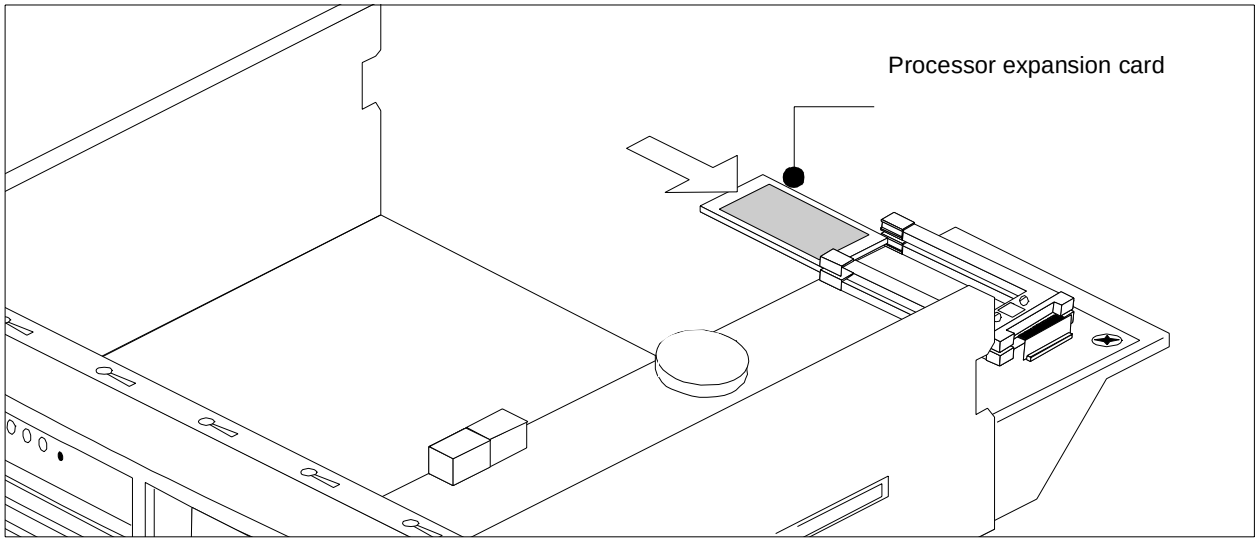
**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

Use this procedure to correctly install a PEC.

1. Disconnect the Business Communications Manager from the wall power outlet.
2. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
3. Decide which slot you are going to install the PEC into on the MSC. If you have more than one card holder (BCM400), populate one card holder completely at a time.
4. Line the card up between the rails of the slot. Ensure the card label is face-up.
5. Carefully slide the PEC into the slot until it is firmly seated.

**Note:** Do not force the card into its slot. If the PEC does not slide in easily, check the alignment.

**Figure 179** Insert the processor expansion card (PEC III)




6 Completely insert the base function tray into the platform base chassis (see "Install the base function tray" on page 201). Continue to the next step of this procedure when complete.

7 Restore the Enterprise Edge to operation. Refer to "Restart the System after Maintenance" on page 197.

8 This procedure is complete.

# Replace Memory

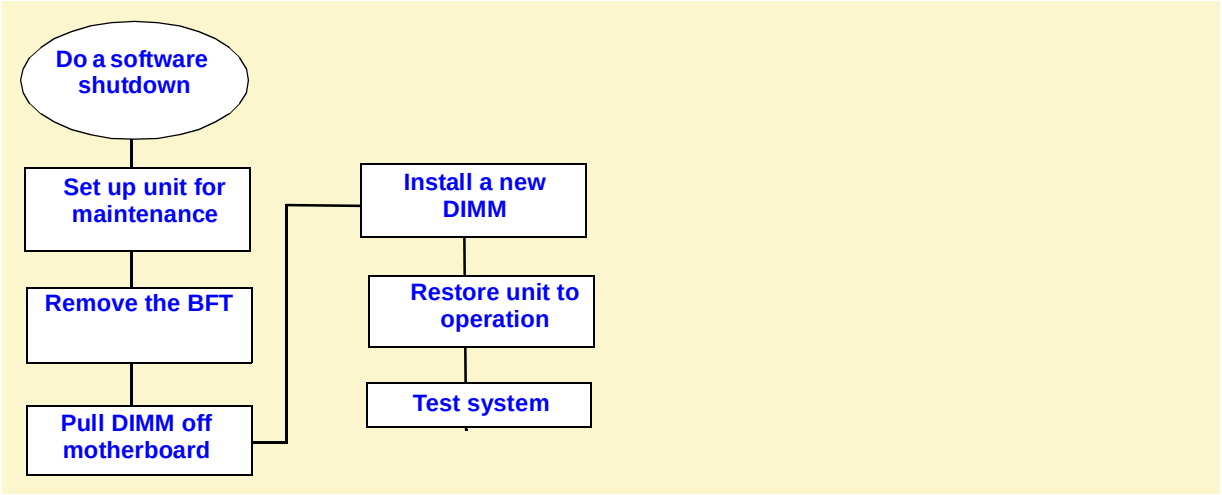
This section describes how to remove and install the random access memory card. This section contains the following procedures:


- "Remove the dual in-line memory module (DIMM) card" on page 308
- "Install the dual in-line memory module (DIMM) card" on page 310


The Business communication manager is equipped with 256 MB of Random Access Memory (RAM). The memory resides on a Dual In-line Memory Module (DIMM) on the main card. The main card contains space to add a second DIMM, or you can upgrade the existing DIMM.

Figure 180 provides an overview of the process for replacing or adding memory chips.

**Figure 180** Memory replacement overview




**Danger:** Risk of shock.
Disconnect the power cord, telephone cables and network cables before opening the computer.
Read and follow installation instructions carefully.

**Caution:** Use only a Nortel Networks approved replacement. Contact your account representative for the current list of approved replacement parts

## Remove the dual in-line memory module (DIMM) card

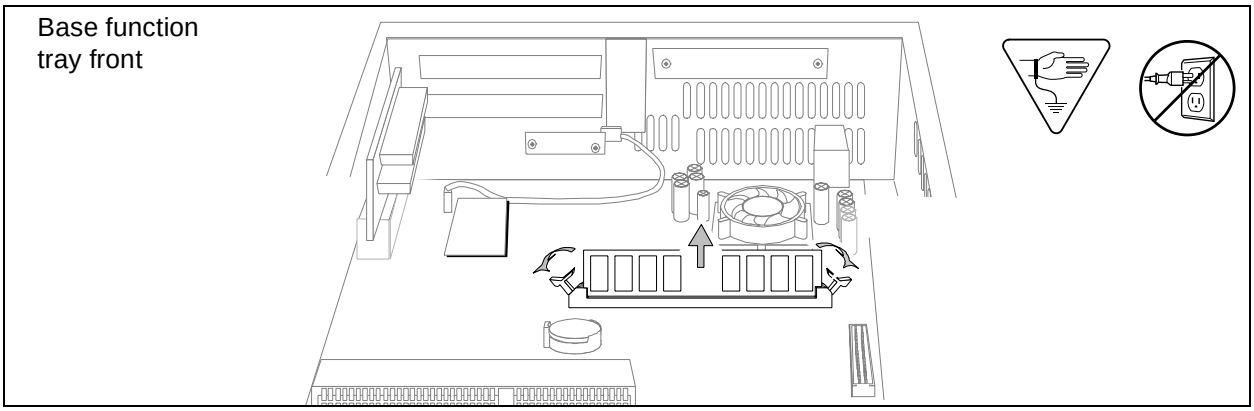
Use this procedure to remove a DIMM when the circuit fails or when you want to increase the amount of RAM in the Business Communications Manager.

**Note:** There must be at least one DIMM installed in the Business Communications Manager in order for the system to function.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

1. If you still have access to the Unified Manager, shut down the system using the Shutdown command. For details refer to "Shut down the system software" on page 195. Otherwise, skip to step 2.
2. Set up the platform base hardware for maintenance, as described in "Shut down the system hardware" on page 196.
3. Disconnect the Business Communications Manager from the AC power outlet.
4. Disconnect any connectors from the front of the base function tray.
5. Remove the platform base chassis cover. See "Remove the platform base chassis top cover" on page 211. Continue to the next step in this procedure when complete.
6. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
7. Partially remove the base function tray from the platform base chassis. Ensure you do not pinch, stretch or damage any cables.
8. Remove the base function tray bezel. See "Remove the base function tray bezel" on page 203. Continue to the next step in this procedure when complete.
9. Remove the WAN card (if applicable). See "Remove the WAN card" on page 285. Continue to the next step in this procedure when complete.
10. Detach the DS30 cable connectors from the MSC.
11. Remove the base function tray completely from the platform base chassis. Ensure you do not pinch, stretch or damage any cables. See "Remove the base function tray" on page 200. Continue to the next step of this procedure when complete.
12. Remove the media services card (see "Remove the media services card (MSC)" on page 292). Continue to the next step of this procedure when complete.
13. Carefully push down on the fastening tabs on either side of the DIMM you want to remove. As you press down on the fastening tabs, the DIMM lifts out of the DIMM slot.
14. Grasp both ends of the DIMM with your fingertips. Lift the DIMM up and away from the DIMM slot (see Figure 181 on page 310). Place the DIMM in a static-free container.

**Figure 181** Remove and replace the dual in-line memory module




**15** This procedure is complete.

## Install the dual in-line memory module (DIMM) card

Use this procedure to install a replacement DIMM or when you want to increase the amount of RAM in the Business Communications Manager.

**Note:** There must be at least one DIMM installed in the Business Communications Manager in order for the system to function.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

**1** Position and correctly align the new DIMM (edge connectors first) into the connector.

**Note:** The DIMM has two notches on the edge connector. Position the DIMM so that one of the notches is on the side of the slot nearest to the Business Communications Manager cards.

**2** Carefully and firmly press down on the top of the DIMM card with your thumbs. At the same time, use your index fingers to move the fastening tabs inward toward the card. When the card is completely inserted in the connector, the fastening tabs clip to the side of the DIMM card.

**Note:** Do not force the DIMM into its slot. If the DIMM does not slide in easily, check the alignment of the DIMM.

**3** Install the media services card (see “Install the media services card (MSC)” on page 294). Continue to the next step of this procedure when complete.

**4** Partially install the base function tray in the platform base chassis.

5 Install the WAN card (if applicable). See “Install the WAN card” on page 287. Continue to the next step of this procedure when complete.

6 Connect the DS30 connectors to the MSC.

7 Completely install the base function tray in the platform base chassis (see “Install the base function tray” on page 201). Ensure you do not pinch or damage any cables.

8 Install the base function tray bezel. See “Install the base function tray bezel” on page 204. Continue to the next step of this procedure when complete.

9 Insert all connectors in the correct locations on the base function tray face.

10 Restore the Business Communications Manager to operation. Refer to “Restart the System after Maintenance” on page 197 for details. Continue to the next step of this procedure when complete.

11 This procedure is complete.

# Replace the Clock/Calendar Battery

This section describes how to remove and install the clock/calendar battery located on the main card. This section provides the following procedures:

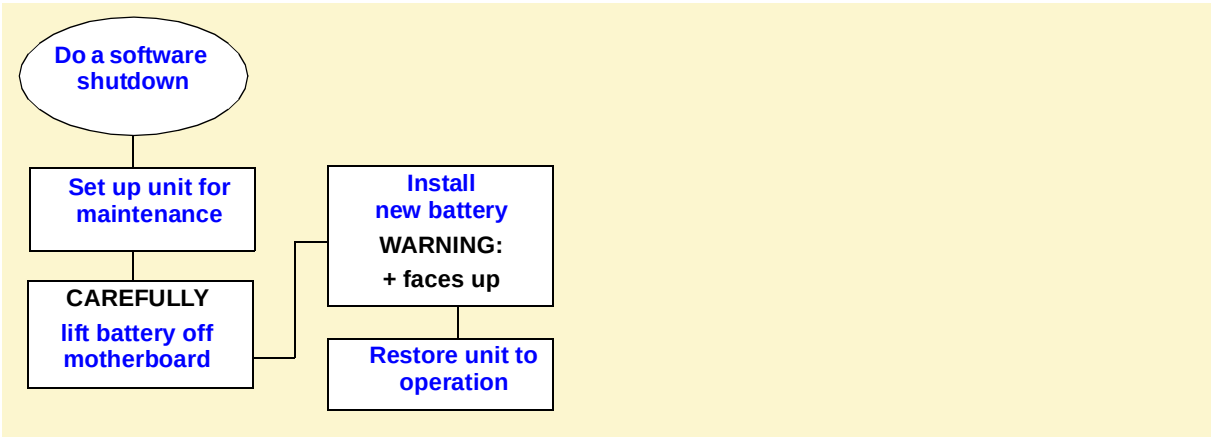

- "Remove the clock/calendar battery" on page 313
- "Install a new clock/calendar battery" on page 314


The clock/calendar battery supplies the power required to keep the CMOS information current if there is a power failure. Figure 177 provides an overview of the process of replacing this component.

**Warning:** You must replace the battery with a CR2032, 3v Maxell coin cell battery. Do not use any other manufacturer because this may invalidate the safety approval of the Business Communications Manager and possibly cause a fire or explosion.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

**Figure 182** Battery replacement overview




**Danger:** Disconnect the power cord, telephone cables and network cables before opening the computer.
Read and follow installation instructions carefully.

## Remove the clock/calendar battery

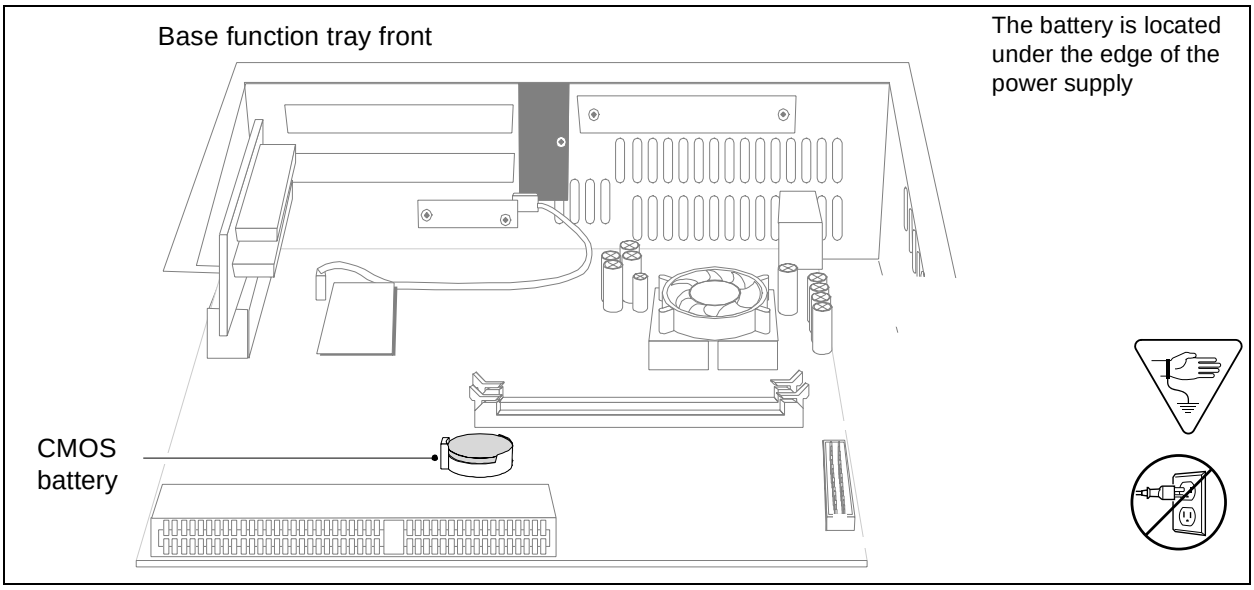
Use this procedure to remove the clock/calendar battery.

**Warning:** Protect the hardware components against damage from electro-static discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

1. If you still have access to the Unified Manager, shut down the system using the Shutdown command. For details refer to "Shut down the system software" on page 195. Otherwise, skip to step 2.
2. Set up the server for maintenance, as described in "Shut down the system hardware" on page 196.
3. Disconnect the Business Communications Manager from the AC power outlet.
4. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
5. Disconnect any connectors from the front of the base function tray.
6. Partially remove the base function tray from the platform base chassis. Do not crimp, stretch or damage cables or connectors.
7. Remove the base function tray bezel. See "Remove the base function tray bezel" on page 203. Continue to the next step of this procedure when complete.
8. Remove the WAN card (if applicable). See "Remove the WAN card" on page 285. Continue to the next step of this procedure when complete.
9. Disconnect the DS30 cables from the MSC. Do not crimp, stretch or damage cables or connectors.
10. Completely remove the base function tray from the platform base chassis. See "Remove the base function tray" on page 200. Continue to the next step of this procedure when complete.
11. Remove the media services card (see "Remove the media services card (MSC)" on page 292). Continue to the next step of this procedure when complete.
12. Use your finger to carefully lift the battery out of the socket. For the location of the battery socket, refer to Figure 183.

**Caution:** Do not use any type of tool to remove the battery.

**Figure 183** Removing the clock/calendar battery




**13** This procedure is complete.

## Install a new clock/calendar battery

Use this procedure to insert a clock/calendar battery into the base function tray.

**Warning:** There is a danger of explosion if you do not replace the battery correctly.
You must replace the battery with a CR2032, 3v Maxell coin cell battery.
The positive side of the battery must face up.
The battery must sit securely in the battery socket.

**Warning:** Protect the hardware components against damage from electrostatic discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

**1** Remove the old battery. See “Remove the clock/calendar battery” on page 313.

**2** Ensure you have the positive side of the battery facing up when you position it in the socket.

**3** Push down until the battery snaps into the socket.

**4** Install the media services card. See “Install the media services card (MSC)” on page 294. Continue to the next step of this procedure when complete.

**5** Install the WAN card (if applicable). See “Install the WAN card” on page 287. Continue to the next step of this procedure when complete.

**6** Partially insert the base function tray into the platform base chassis.

**7** Connect the DS30 connectors to the MSC.

8 Position the PCI cover plate on the front of the base function tray such that the base function tray and cover plate screw holes align.

9 Position the PCI cover plate locking screw in the PCI cover plate. Tighten the PCI cover plate locking screw until the plate is firmly set in place (see Figure 165).

10 Install the base function tray bezel (see “Install the base function tray bezel” on page 204). Continue to the next step in this procedure when complete.

11 Completely insert the base function tray into the platform base chassis. See “Install the base function tray” on page 201. Continue to the next step of this procedure when complete.

12 Restore the Business Communications Manager to operation. For details, refer to “Restart the System after Maintenance” on page 197. Continue to the next step of this procedure when complete.

13 This procedure is complete.

# Chapter 11
# Install Telephones and Peripherals

This chapter describes how to install telephones and peripherals and provides the following primary topics:


- "System Telephones" on page 317
- "Emergency Telephone Installation" on page 321
- "Install IP Telephones" on page 322
- "Install Radio-Based Portable Systems" on page 322
- "Move Telephones" on page 324


You can add telephones and peripherals before or after you initialize your system. Set configuration is determined by the which station module you are using, and what DS30 channel settings you chose for the module. Refer to Chapter 13, "Install Analog Terminal Adapters (ATA)," on page 355.

The system creates default settings for the telephone DN records when it is first initialized. The settings are based on which telephony profile you chose. To change these settings, use the Unified Manager application. Specific instructions for configuring telephone operation through the Unified Manager are contained in the *Business Communications Manager 3.0 Programming Operations Guide*.

**Note:** Programming occurs on the set when the Business Communications Manager recognizes the set on the system.

## System Telephones

The Business Communications Manager system supports a number of analog, digital, IP telephony and cordless telephones. Refer to "Telephones and adapters" on page 91 for a description of the sets the system supports.

Analog telephones are supported either through analog station media (ASM) bay modules or by connecting to a digital module through an Analog Terminal Adapter 2 (ATA2).

Documentation describing installation and set features is supplied with each piece of equipment.

**Caution:** Off-premises extensions (OPX) are supported by ASM 8+ only.
Digital and analog telephones must not be installed on any connections not protected by building equipment.

## Analog terminal adapter

The Analog Terminal Adapter 2 (ATA 2) connects a standard analog voice device or data communication device to a digital line connector on the Business Communications Manager system.

Refer to Chapter 13, “Install Analog Terminal Adapters (ATA),” on page 355 for the requirements and procedure for installing the device.

## Central Answering Position (CAP/eCAP)

Create a Central Answering Position (CAP) that provides additional auto dial positions or additional line appearances.

The legacy CAP consists of an M7324 telephone with one or two CAP modules. This configuration requires a Supplementary Power Supply (SAPS) to support the additional modules. Each CAP module provides 48 programmable keys with indicators. If the telephone is configured as an extended CAP (eCAP) in system programming, the module supports line appearances as well as any memory key functions.

The Business Series Terminal version of the CAP consists of a T7316E telephone and from one to nine Key Indicator Modules (KIMs). Each module provides 24 programmable keys with indicators. If the telephone is configured as an eCAP, a maximum of four modules can be added (eKIMs). A T7316E+eKIM can support line appearances, multiple appearances of a target line, and Hunt group designators in additional to memory key programming on the eKIMs. A T7316E/KIM configuration that is not configured as an eCAP can support up to nine ordinary KIMs (OKIMs). In this configuration, only memory button programming is supported. A Supplementary Power Supply is required after the fifth module is added. **Programming note:** The T7316E+eKIM does not support auto dial keys programmed with Hunt group DNs.

For detailed configuration information, refer to the *Programming Operations Guide.* Also refer to the CAP user card for instructions about using a CAP. For installation procedures for the CAP, refer to the installation documents that came with the CAP.

# Telephone port and DN cross-reference

The media bay module that analog and digital telephones connect to dictates DNs and port numbers. Use Table 51 and Table 52 to identify which port connects to each telephone. For future reference, put a checkmark beside the ports where there are telephones installed.

**Note:** The following table is based on a system with three-digit DNs, with a start DN of 221. If your system has longer DNs, the system automatically adds a repeat of the first digit for each additional DN length unit.for example, 221 becomes 2221.

**Double density:** If a DS30 bus is set to double density, a second level of DNs and ports become available, allowing 32 digital or analog telephones on a DS30 bus. On a default system, bus 06 and 07 are set to Partial Double Density (PDD), and only the first level is available to digital telephones. The second level remains designated as B2 channels, which allows Companion to still be used on these two bus blocks. When the system is set to Full Double Density, then all DS30 bus blocks have 32 B1 channels. In a FDD system, Companion is not support.

Also, note on the tables below that DN numbering differs between systems that were upgraded from BCM 2.5 software and systems that were new with BCM 3.0 or newer software.

**Table 51** Cross-referencing ports and DNs on a 2.5 system upgraded to 3.0 or newer software

| Pins | Port* | DS 30 bus 02 DNs | DS 30 bus 03 DNs | DS 30 bus 04 DNs | DS 30 bus 05 DNs | DS 30 bus 06 DNs | DS 30 bus 07 DNs |
|---|---|---|---|---|---|---|---|
| 26/1 | X01 | 221 | 237 | 253 | 269 | 285 | 301 |
| 27/2 | X02 | 222 | 238 | 254 | 270 | 286 | 302 |
| 28/3 | X03 | 223 | 239 | 255 | 271 | 287 | 303 |
| 29/4 | X04 | 224 | 240 | 256 | 272 | 288 | 304 |
| 30/5 | X05 | 225 | 241 | 257 | 273 | 289 | 305 |
| 31/6 | X06 | 226 | 242 | 258 | 274 | 290 | 306 |
| 32/7 | X07 | 227 | 243 | 259 | 275 | 291 | 307 |
| 33/8 | X08 | 228 | 244 | 260 | 276 | 292 | 308 |
| 34/9 | X09 | 229 | 245 | 261 | 277 | 293 | 309 |
| 35/10 | X10 | 230 | 246 | 262 | 278 | 294 | 310 |
| 36/11 | X11 | 231 | 247 | 263 | 279 | 295 | 311 |
| 37/12 | X12 | 232 | 248 | 264 | 280 | 296 | 312 |
| 38/13 | X13 | 233 | 249 | 265 | 281 | 297 | 313 |
| 39/14 | X14 | 234 | 250 | 266 | 282 | 298 | 314 |
| 40/15 | X15 | 235 | 251 | 267 | 283 | 299 | 315 |
| 41/16 | X16 | 236 | 252 | 268 | 284 | 300 | 316 |
| **Second-level DNs (DS 30 bus set to Full Double Density)** | | | | | | | |

**Table 51** Cross-referencing ports and DNs on a 2.5 system upgraded to 3.0 or newer software

| Pins | Port* | DS 30 bus 02 DNs | DS 30 bus 03 DNs | DS 30 bus 04 DNs | DS 30 bus 05 DNs | DS 30 bus 06 DNs | DS 30 bus 07 DNs |
|---|---|---|---|---|---|---|---|
| **Pins** | **Port*** | **DS 30 bus 02 DNs** | **DS 30 bus 03 DNs** | **DS 30 bus 04 DNs** | **DS 30 bus 05 DNs** | **DS 30 bus 06 DNs**** | **DS 30 bus 07 DNs**** |
| 26/1 | X17 | 377 | 393 | 409 | 425 | 441 | 457 |
| 27/2 | X18 | 378 | 394 | 410 | 426 | 442 | 458 |
| 28/3 | X19 | 379 | 395 | 411 | 427 | 443 | 459 |
| 29/4 | X20 | 380 | 396 | 412 | 428 | 444 | 460 |
| 30/5 | X21 | 381 | 397 | 413 | 429 | 445 | 461 |
| 31/6 | X22 | 382 | 398 | 414 | 430 | 446 | 462 |
| 32/7 | X23 | 383 | 399 | 415 | 431 | 447 | 463 |
| 33/8 | X24 | 384 | 400 | 416 | 432 | 448 | 464 |
| 34/9 | X25 | 385 | 401 | 417 | 433 | 449 | 465 |
| 35/10 | X26 | 386 | 402 | 418 | 434 | 450 | 466 |
| 36/11 | X27 | 387 | 403 | 419 | 435 | 451 | 467 |
| 37/12 | X28 | 388 | 404 | 420 | 436 | 452 | 468 |
| 38/13 | X29 | 389 | 405 | 421 | 437 | 453 | 469 |
| 39/14 | X30 | 390 | 406 | 422 | 438 | 454 | 470 |
| 40/15 | X31 | 391 | 407 | 423 | 439 | 455 | 471 |
| 41/16 | X32 | 392 | 408 | 424 | 440 | 456 | 472 |

* For each port, substitute the X for the DS30 bus number. Example: Port X01 on DS30 bus 02 is port 0201.
** On default systems, these two DS30 bus blocks are set to Partial Double Density (PDD), which means that the second level of DNs are not available.

**Table 52** Cross referencing ports and DNs on a new version 3.0 or newer system

| Pins | Port* | DS 30 bus 02 DNs | DS 30 bus 03 DNs | DS 30 bus 04 DNs | DS 30 bus 05 DNs | DS 30 bus 06 DNs | DS 30 bus 07 DNs |
|---|---|---|---|---|---|---|---|
| 26/1 | X01 | 221 | 253 | 285 | 317 | 349 | 381 |
| 27/2 | X02 | 222 | 254 | 286 | 318 | 350 | 382 |
| 28/3 | X03 | 223 | 255 | 287 | 319 | 351 | 383 |
| 29/4 | X04 | 224 | 256 | 288 | 320 | 352 | 384 |
| 30/5 | X05 | 225 | 257 | 289 | 321 | 353 | 385 |
| 31/6 | X06 | 226 | 258 | 290 | 322 | 354 | 386 |
| 32/7 | X07 | 227 | 259 | 291 | 323 | 355 | 387 |
| 33/8 | X08 | 228 | 260 | 292 | 324 | 356 | 388 |
| 34/9 | X09 | 229 | 261 | 293 | 325 | 357 | 389 |
| 35/10 | X10 | 230 | 262 | 294 | 326 | 358 | 390 |
| 36/11 | X11 | 231 | 263 | 295 | 327 | 359 | 391 |
| 37/12 | X12 | 232 | 264 | 296 | 328 | 360 | 392 |
| 38/13 | X13 | 233 | 265 | 297 | 329 | 361 | 393 |
| 39/14 | X14 | 234 | 266 | 298 | 330 | 362 | 394 |

**Table 52** Cross referencing ports and DNs on a new version 3.0 or newer system (Continued)

| Pins | Port* | DS 30 bus 02 DNs | DS 30 bus 03 DNs | DS 30 bus 04 DNs | DS 30 bus 05 DNs | DS 30 bus 06 DNs | DS 30 bus 07 DNs |
|---|---|---|---|---|---|---|---|
| 40/15 | X15 | 235 | 267 | 299 | 331 | 363 | 395 |
| 41/16 | X16 | 236 | 268 | 300 | 332 | 364 | 396 |
| **Second-level DNs (DS 30 bus set to Full Double Density)** | | | | | | | |
| **Pins** | **Port*** | **DS 30 bus 02 DNs** | **DS 30 bus 03 DNs** | **DS 30 bus 04 DNs** | **DS 30 bus 05 DNs** | **DS 30 bus 06 DNs**** | **DS 30 bus 07 DNs**** |
| 26/1 | X17 | 237 | 269 | 301 | 333 | 365 | 397 |
| 27/2 | X18 | 238 | 270 | 302 | 334 | 366 | 398 |
| 28/3 | X19 | 239 | 271 | 303 | 335 | 367 | 399 |
| 29/4 | X20 | 240 | 272 | 304 | 336 | 368 | 400 |
| 30/5 | X21 | 241 | 273 | 305 | 337 | 369 | 401 |
| 31/6 | X22 | 242 | 274 | 306 | 338 | 370 | 402 |
| 32/7 | X23 | 243 | 275 | 307 | 339 | 371 | 403 |
| 33/8 | X24 | 244 | 276 | 308 | 340 | 372 | 404 |
| 34/9 | X25 | 245 | 277 | 309 | 341 | 373 | 405 |
| 35/10 | X26 | 246 | 278 | 310 | 342 | 374 | 406 |
| 36/11 | X27 | 247 | 279 | 311 | 343 | 375 | 407 |
| 37/12 | X28 | 248 | 280 | 312 | 344 | 376 | 408 |
| 38/13 | X29 | 249 | 281 | 313 | 345 | 377 | 409 |
| 39/14 | X30 | 250 | 282 | 314 | 346 | 378 | 410 |
| 40/15 | X31 | 251 | 283 | 315 | 347 | 379 | 411 |
| 41/16 | X32 | 252 | 284 | 316 | 348 | 380 | 412 |

* For each port, substitute the X for the DS30 bus number. Example: Port X01 on DS30 bus 02 is port 0201.
** On default systems, these two DS30 bus blocks are set to Partial Double Density (PDD), which means that the second level of DNs are not available.

# Emergency Telephone Installation

You can use the emergency telephone to make calls when there is no power to the Business Communications Manager system.

To install an emergency telephone on the Business Communications Manager system, connect a single line analog telephone to the auxiliary port on the CTM. When you make a call from the emergency telephone, the auxiliary port uses the telephone line connected to the Line 1 port of the CTM.

**TIP:** You can connect an emergency telephone to every CTM installed on your Business Communications Manager system.

Use the following steps to install the emergency telephone.

1. Connect a single line analog telephone to the auxiliary port on the CTM.
2. Connect an analog PSTN line cable to the Line 1 port of the CTM.

# Install IP Telephones

The Business Communications Manager emobility strategy includes support for the Nortel Networks i2004, i2002, and i2001 IP telephones, the Nortel Networks i2050 Software Phone, and the NetVision and the NetVision Data portable handsets.

The system can be set to automatically assign DNs to the Nortel IP telephones. If you choose to manually assign DNs, choose DNs from the following digital range, if possible:

Ensure that the DN type in each DN record is set to IP telephony.

- B1 line DNs can default to unused DNs from 221 to 376.
- B2 line DNs can default to unused DNs from 377 to 472.

NetVision DNs are assigned to the handsets through the H.323 section under IP Telephony on the Unified Manager. Use the DNs within the ranges described above. If no DN is specified in the record, the system will automatically assign one when the handset connects to the system.

For details about configuring DN records for the IP telephones and the NetVision telephones, refer to the *IP Telephony Configuration Guide.*

# Install Radio-Based Portable Systems

There are three radio-based systems available for the Business Communications Manager system. Availability depends on the geographical location of the system and is determined by the region you select for the system during system configuration.

**Note:** The Symbol NetVision telephones are wireless telephones, but to the Business Communications Manager they appear as IP telephones.

## Companion portable system

In North America, you can provide cordless access throughout your site using the Companion cordless system. This system allows you to provide portable units that are twinned with stationary sets. This allows you to accommodate users who are mobile within the range of the system.

Companion handsets communication through base stations that are connected to DSMs on the Business Communications Manager. You can install a maximum of 32 handsets per DSM, since the handsets can use either of the B channels.

"Regional mobility services" on page 400 lists the region profiles that can accommodate the Companion system.

Companion sets default to DNs in the 565 to 596 DN range and use the DN type Companion.

The following documentation is available for this system:

- A site survey is required before you can install this system. When you purchase the Companion system, you are provided with deployment documentation that will assist you in planning base station locations.
- Refer to Chapter 12, “Install Companion or DECT Systems,” on page 325 for installation instructions.
- The handset vendors provide a user guide with each set that describes the handset features.

## DECT Systems

A DECT media bay module provides a pathway for a maximum of 32 cordless handsets to access the Business Communications Manager. The handsets can either be twinned with stationary sets, or they can act as independent sets.

Up to eight base stations can be deployed around a site. Each base station connects to a port on the DECT media bay module, which provides both trunk (BRI) and station module functions. The handsets are registered to the base station, but they can also roam between base stations.

DECT sets are ISDN sets, and use the DN range of 597 to 624 with DN type ISDN and DECT. If you require more than 28 DECT handsets, use DNs from the Companion range and change the DN type to ISDN and DECT. The Unified Manager provides a DECT Wizard that helps you coordinate the handset DNs between the Business Communications Manager and the DECT module. Refer to the DECT documentation for details about using the Wizard.

**Note:** On systems upgraded from 2.0 to 2.5, with three-digit DNs starting at DN 221, DECT handsets default to the 501 to 532 DN range.

These numbers are based on systems with three-digit DNs that use the default DN of 221. If you change either of those settings on your system, adjust the numbering accordingly.

“Regional mobility services” on page 400 lists the regions that can accommodate DECT.

The following documentation is available for this system:

- The *Nortel Networks M626x DECT Deployment Tool* guide is available on the Business Communications Manager CD. Use the information in this guide to determine the most effective locations within your site for the base stations.
- Each handset also comes with a user guide that describes the handset features.
- The *Business Communications Manager 3.0 DECT Installation and Maintenance Guide*, also on the CD, describes the installation of the module and radio base station, and how to configure the system to the Business Communications Manager.

### T7406 cordless systems

The T7406 cordless system consists of a base station that connects to three ports on a Business Communications Manager digital station module, providing a radio interface for three cordless handsets. The cordless handsets register to the base station, which transfers the call over the telephone lines connected to the system. The handsets are configured to emulate the T7316/M7310 telephone features. This system is most suited to small to medium office environments set up in an open fashion.

T7406 cordless telephones use the DNs for the ports on the station module that the base station is connected to. They are digital sets and use M7310/T7316 as an operational model.

The *T7406 Cordless Telephone Installation Guide* provides:

- deployment parameters
- a description of the handset features
- instructions for installing the base station
- instructions on how to correctly charge the handset battery
- general operational directions, including describing special operational features of the handset

## Move Telephones

You can move an Business Communications Manager digital telephone to a new location within the system without losing its programmed settings if the telephone has been enabled with **Set relocation**. When you enable Set relocation (automatic telephone relocation), the internal numbers, autodial settings, and personal speed dial codes remain with the telephone when you disconnect the telephone.

If you connect a different telephone to the jack before you reconnect the moved telephone, the new telephone takes the programmed settings. The Business Communications Manager system can no longer identify the old telephone.

After you plug a moved set into a new jack, the Business Communications Manager system can take 45 seconds to identify the telephone. Programming relocation takes three minutes to complete. Wait for this to occur before you change any settings for the telephone in the system.

**Warning:** If you disconnect a relocated telephone before the relocation programming is complete, the telephone can lose the programmed settings.

**Note:** Automatic telephone relocation is disabled by default.

For IP telephones to retain DN-specific features, the **Keep DN Alive** setting for the telephone programming must be set to Yes.

# Chapter 12
# Install Companion or DECT Systems

This chapter describes the two radio-based systems that can be added to the Business Communications Manager system to provide mobile communications. This chapter provides the following primary topics:


- "The Companion Wireless System" on page 325
- "Companion Hardware Installation" on page 327
- "Install DECT Systems" on page 352


Both systems require radio-equipped base stations connected to specific types of media bay modules installed in the Business Communications Manager.

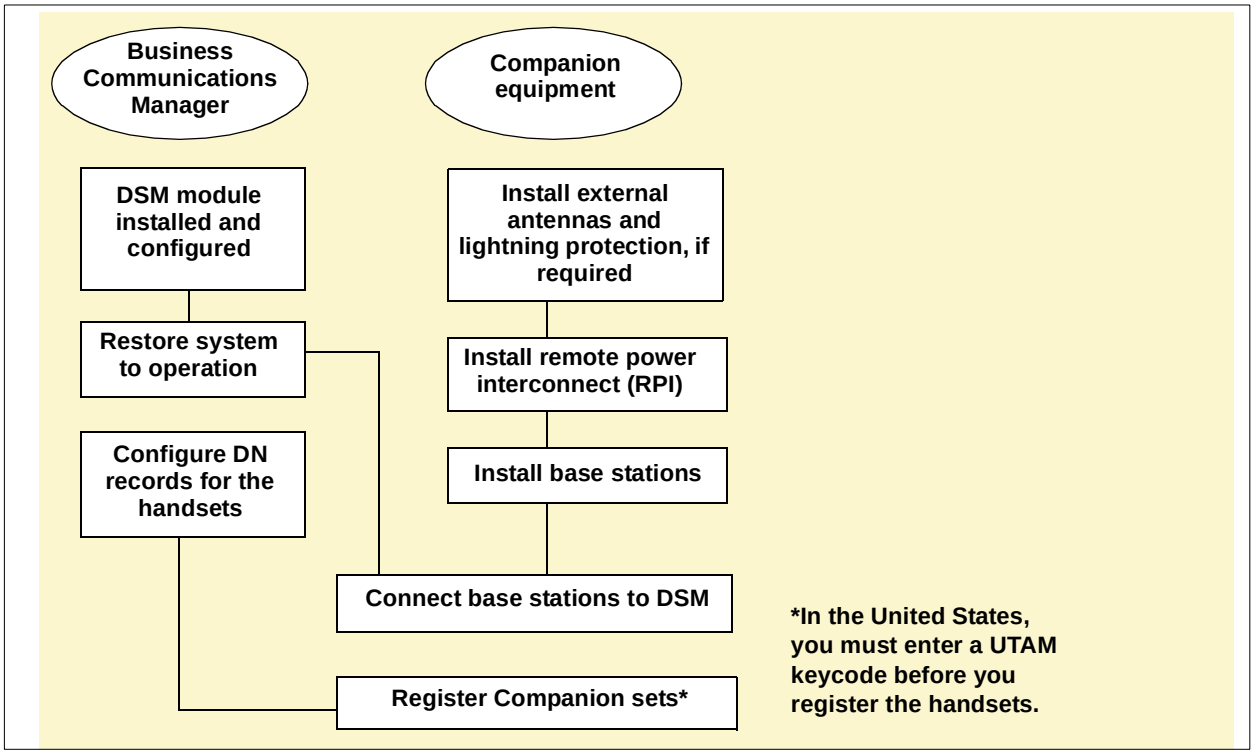
- The Companion requires a DSM module for the base stations to plug into. Refer to "The Companion Wireless System" on page 325.
- DECT provides virtual BRI loops within the DECT module. Refer to "Install DECT Systems" on page 352.

## The Companion Wireless System

Your Companion portable telephone allows you to leave your desk without missing important telephone calls. The portable telephones can access most Business Communications Manager business features such as call forward, call transfer, voice conference, and voice messaging using feature codes.

Figure 184 provides an overview of the process for installing a Companion wireless system onto the Business Communications Manager system.

**Figure 184** Overview of installing a Companion system


Business Communications Manager
Companion equipment
DSM module installed and configured
Install external antennas and lightning protection, if required
Restore system to operation
Install remote power interconnect (RPI)
Configure DN records for the handsets
Install base stations
Connect base stations to DSM
Register Companion sets*
*In the United States, you must enter a UTAM keycode before you register the handsets.

**Note:** Companion wireless availability is region-specific. Refer to "Regional mobility services" on page 400. This option also requires a software keycode for activation.

## Companion components

Business Communications Manager Companion has four main components:

**Software** - Companion software manages the telephone traffic between Companion base stations and portable telephones. Base stations connect to Business Communications Manager in the same way that Business Communications Manager sets do. You register the Companion portable telephones on the system. They do not require any ports on the system. You can connect a maximum of 60 portable telephones and a maximum of 32 base stations (32 cells) to the system.

**Note:** If you choose a 3/5 channel split for your system, you cannot assign a module to channel 7. This limits you to a maximum of 16 base stations, which can support a maximum of 30 handsets.

**Companion base stations** — Position the base stations around the coverage area to send and receive calls between the portable telephones and Business Communications Manager. Base stations use digital radio technology and support handoff and roaming within the coverage area. The coverage area can be a maximum of 160,000 square meters (1,700,000 square feet) when using the maximum number of base stations.

**Companion wireless handsets** — Business Communications Manager supports the following wireless handsets: Companion 3020, Companion C3050 Etiquette, Companion C3050 CT2Plus, and Companion C3060.

The portable telephones used with your Business Communications Manager system are small, lightweight units with complete digital performance to provide clear voice quality. Companion portable telephones feature a three-line, 16-character, alphanumeric display.

**Administration and Maintenance Tools** — Programming of the Companion system is easily and quickly done through the Business Communications Manager Unified Manager. You can assign portable telephones to the system, check base station parameters, and enable and disable registration through programming.

Companion Diagnostics Software allows you to run diagnostics on the wireless system. You run the diagnostics using a personal computer located at the customer site or in a remote location.

For more information about programming Companion and running diagnostics, see the *Business Communications Manager 2.5, Programming Operations Guide*.

# Companion Hardware Installation

The Companion hardware must be in place and configured before you can use the handsets to connect to the Business Communications Manager. This section describes how to install the Companion hardware components.

The base station has the option of using internal or external antennas. For most installations, the internal antenna will be used. If you need to install external antennas, refer to "Install an external antenna and lightning surge protection" on page 342.

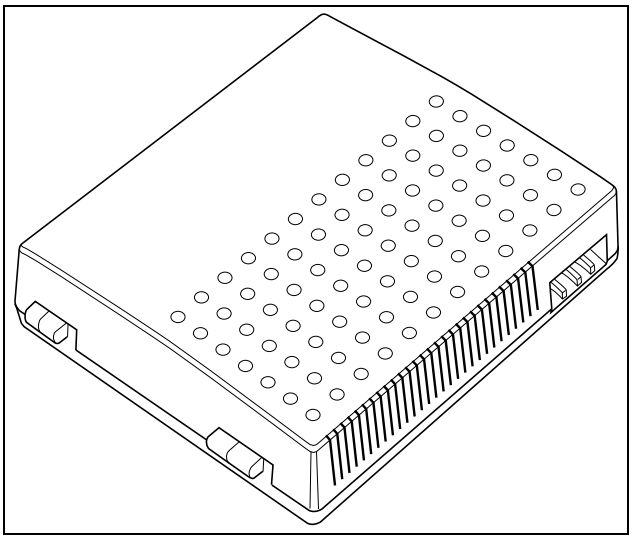
## Install the base station remote power interconnect (RPI) unit

The remote power interconnect unit (RPI) provides remote power for base station support. Figure 185 shows a diagram of the RPI.

**Caution:** The RPI unit must have the DC backup power supplied by a UL listed universal power supply (UPS).
The UPS must have an output voltage rating of 44 to 52 V DC, with a maximum fault current limit of 6 A to protect the RPI output wiring. If these requirements are not met, it is necessary to use class 1 wiring.

**Warning:** Install the RPI units inside a building.
The AC outlet powering the RPI must be installed near the equipment and must be easily accessible.
The length of the RPI cord, from the outside surface of the unit to the plug, must be a minimum of 1.3 m (4.5 ft) and a maximum of 4.6 m (15 ft).

**Figure 185** RPI unit



There are two versions of the RPI unit:

- The RPI-8 BIX UL supports a maximum of eight base stations.
- The RPI-16 BIX UL supports a maximum of 16 base stations.

Each RPI has a connection printed-circuit board and either one (RPI-8 BIX UL) or two (RPI-16 BIX UL) power supply units (PSUs). The maximum input power consumption of an RPI is 240 W. If you use a UPS 48 V dc backup source, the maximum input power requirement of the RPI is 140 W.

Install a second PSU to the RPI-8 BIX UL to upgrade an RPI-8 BIX UL to an RPI-16 BIX UL.

If you distribute the RPIs around the site, the number and type of RPIs depend on where you place and how you power the base stations.

Use Table 53 to determine how many base stations and how many PSUs you need for the number of base stations:

**Table 53** RPI Requirements

| Base stations | RPI-16 and RPI-8 required | PSUs required |
|---|---|---|
| 1–8 | 1 RPI-8 | 1 PSU |
| 9–16 | 1 RPI-16 | 2 PSUs |
| 17–24 | 1 RPI-16 and 1 RPI-8 | 3 PSUs |
| 25–32 | 2 RPI-16 | 4 PSUs |

## Mount the RPI unit

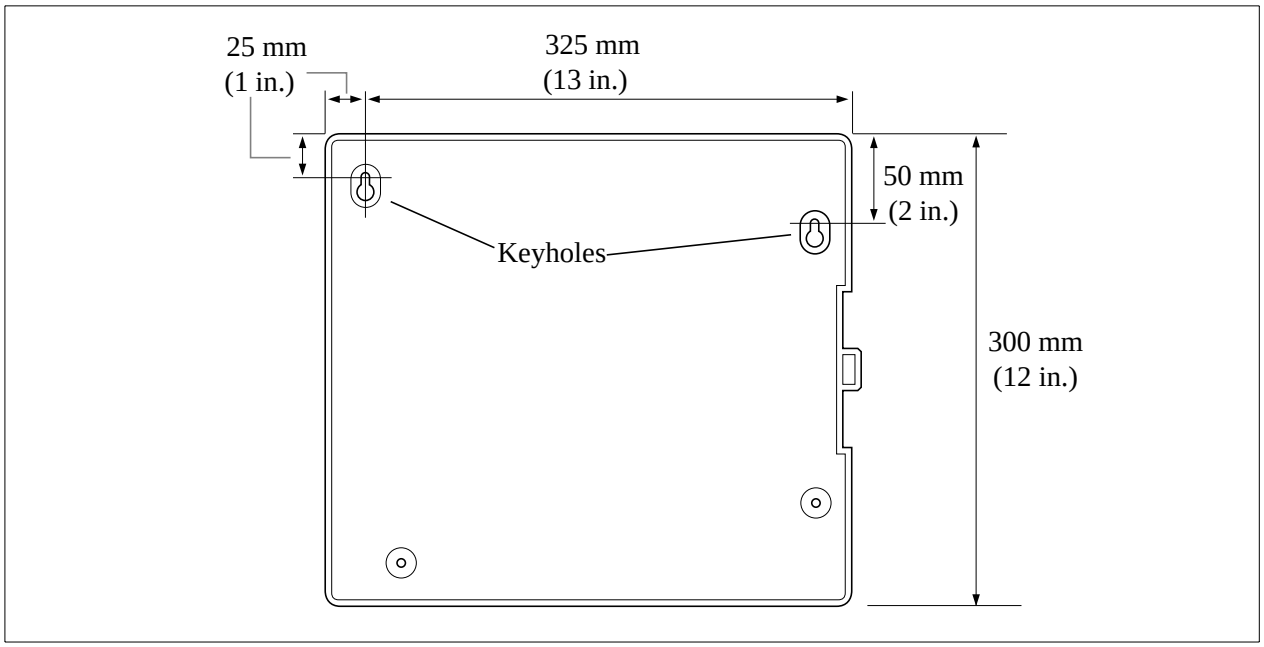
Use the following guidelines to mount the RPI unit:

- Provide adequate ventilation to prevent overheating. Leave a clearance of a minimum of 125 mm (5 in.) around the RPI.
- To install two RPIs, one above the other, leave a clearance of a minimum of 300 mm (12 in.) between them to provide acceptable ventilation and to prevent overheating.
- Install RPIs a minimum of 300 mm (12 in.) from the ceiling.

Use this procedure to mount the RPI unit.

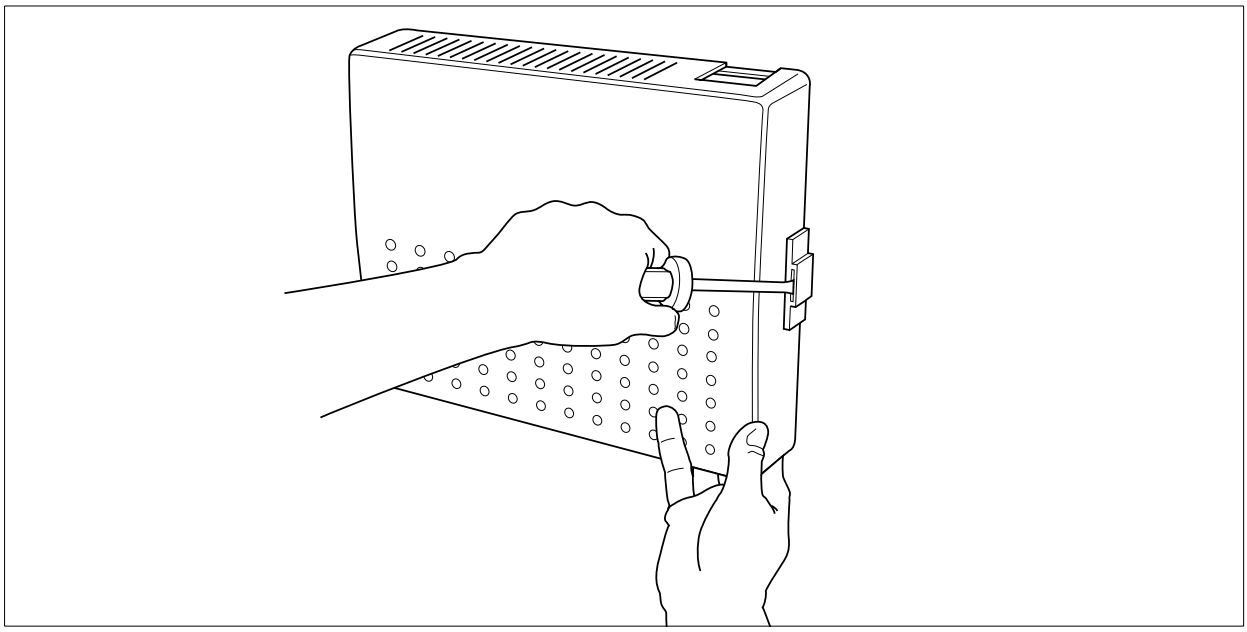
**1** Partially install two #10 50 mm (2 in.) screws using the dimensions shown in Figure 186.

**Figure 186** RPI mounting holes



**2** Open the cover with a screwdriver. Push the screwdriver in, and then down, to release the latch on the right side. Remove the cover by lifting it up. Refer to Figure 187.

**Figure 187** Open the RPI cover

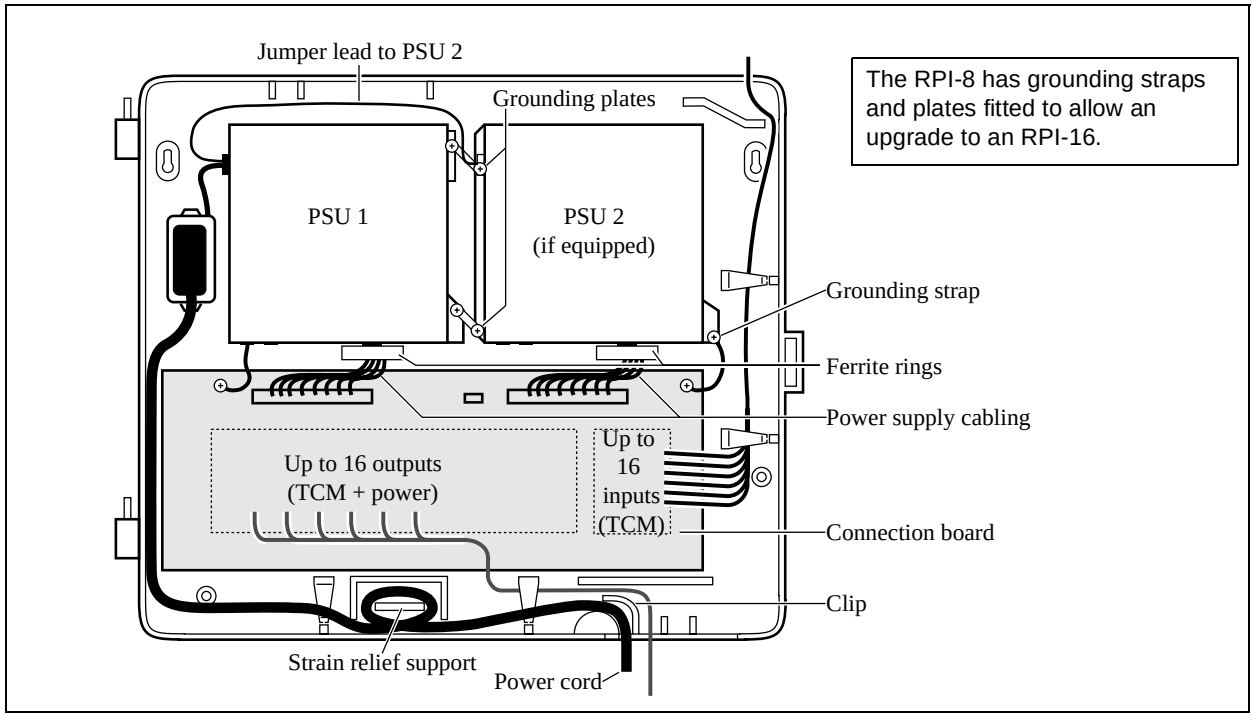


**3** Hang the RPI on the two screws. Tighten the screws.

**4** Install the remaining two screws.

**5** Feed the power cord through the bottom of the RPI and route it through the clip and around the strain relief support. Figure 188 shows how to route the power cord.

**Figure 188** RPI components




**6** Route the power cord to the input power socket just to the left of PSU 1.

**7** Connect the plug to the socket.

**8** Follow the appropriate wiring instructions in the wiring charts in section, "RPI wiring and connections".

**Caution:** Do not apply power to the RPI until its installation and wiring are complete.

**9** After the cable is wired correctly, connect the RPI power cord to the ac outlet.

**10** Label each RPI.

**11** This procedure is complete.

## RPI wiring and connections

The maximum two-way DC loop resistance for power pairs, including interconnections for each base station, is 75 ohms. You need one or two power pairs between the RPI and the base station. The number of power pairs depends on the wire size of the power pair and the distance between the base station and the RPI.

**Caution:** Do not run unprotected power cables outdoors.

The maximum cable distances allowed between the RPI and the base station depend on the size of wire you use. Refer to Table 54.

**Table 54** Cable distances

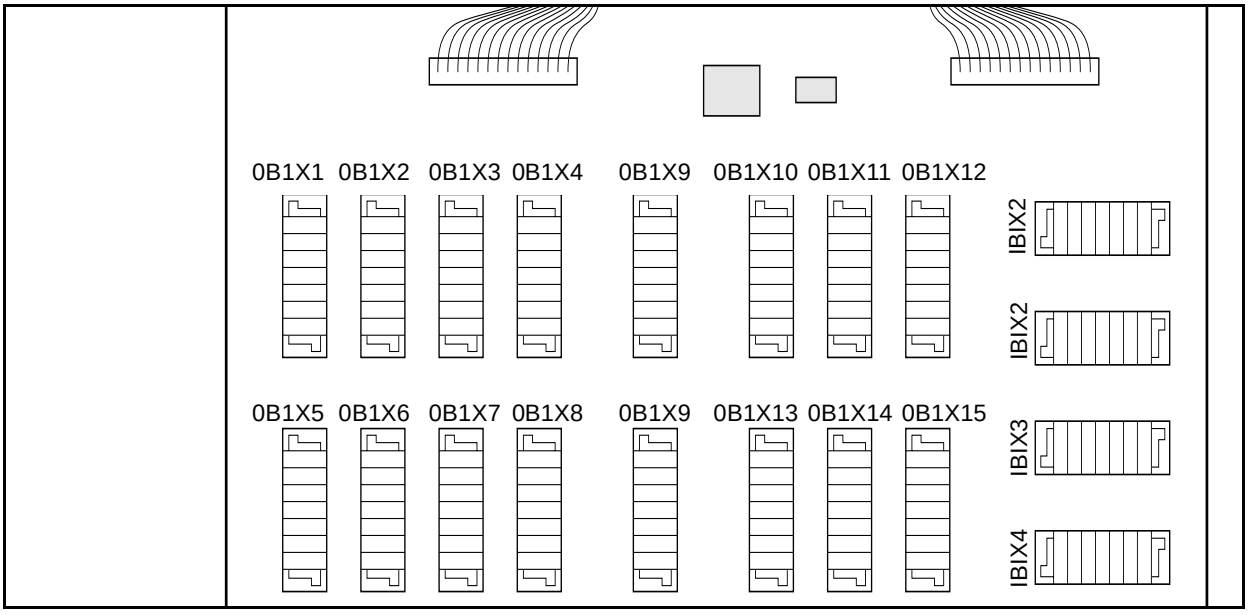
| Wire size | Single pair | Double pair |
|---|---|---|
| 0.6 mm (22 AWG) | 800 m (2,500 ft.) | 1200 m (4,000 ft.) |
| 0.5 mm (24 AWG) | 500 m (1,500 ft.) | 1000 m (3,000 ft.) |

**Caution:** When you use two power pairs, connect both pairs with the same polarity.

### *Connect the RPI*

Connect the power pairs to the correct connectors. Figure 189 shows the location of the input and output connectors on the RPI connector printed-circuit board.

**Figure 189** RPI connector printed-circuit board

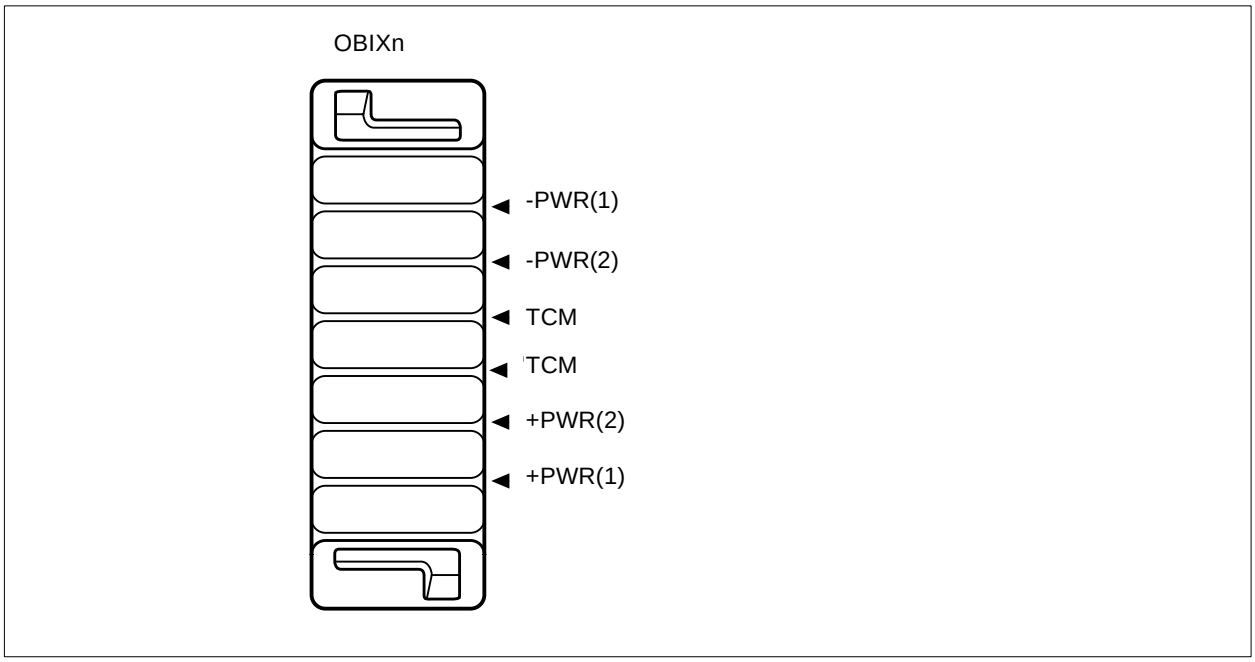


### *RPI output connections*

Feed the output pairs in through the bottom of the RPI and route the pairs to the output connectors. Figure 190 shows how to route the output pairs. If you use one pair to power a base station, connect the power pair to -PWR(1) and +PWR(1). If you use two pairs to power a base station, connect one pair to -PWR(1) and +PWR(1), and the second pair to -PWR(2) and +PWR(2).

**Caution:** Ensure both pairs have the same polarity.
If you connect two power pairs with opposite polarities, you can damage the base station and RPI.

**Figure 190** Output connector pinout




### *RPI input connections*

Feed the TCM input pairs from the Business Communications Manager distribution frame through the top of the RPI and route them to the input connectors (IBIX1 to IBIX4).

Figure 191 shows how to route the input pairs. The maximum number of input pairs in an RPI installation is 16. Table 55 lists the pinout and signal references.

**Figure 191** Input connector pinout

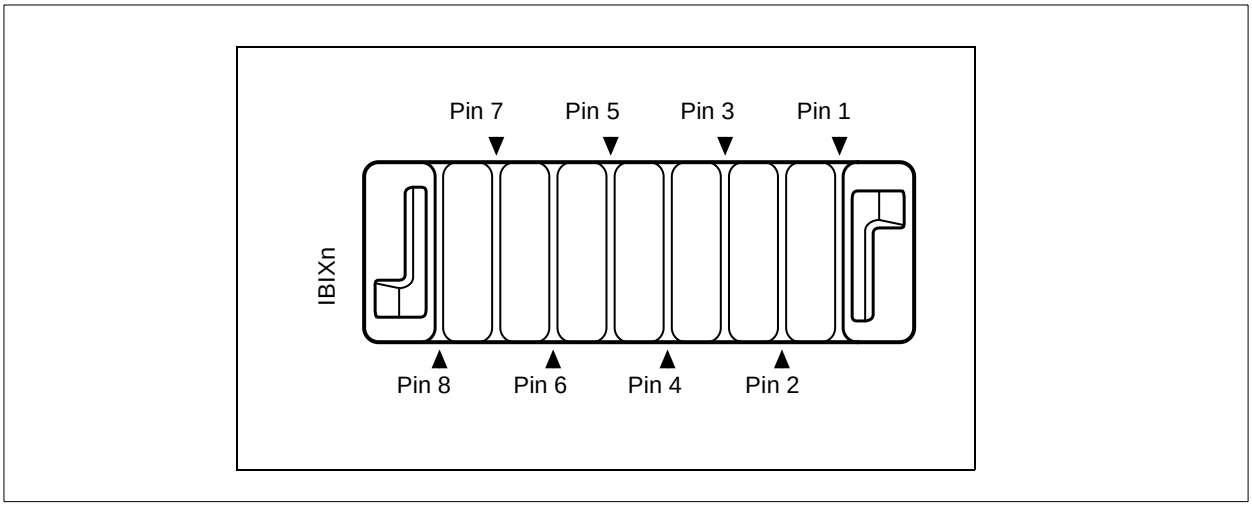



**Table 55** Input wiring

| Connector | Pin | Signal | Output connector |
|---|---|---|---|
| IBIX1 | 1, 2 | TCM 1 | OBIX1 |
| | 3, 4 | TCM 2 | OBIX2 |
| | 5, 6 | TCM 3 | OBIX3 |
| | 7, 8 | TCM 4 | OBIX4 |
| IBIX2 | 1, 2 | TCM 5 | OBIX5 |
| | 3, 4 | TCM 6 | OBIX6 |
| | 5, 6 | TCM 7 | OBIX7 |
| | 7, 8 | TCM 8 | OBIX8 |
| IBIX3 | 1, 2 | TCM 9 | OBIX9 |
| | 3, 4 | TCM 10 | OBIX10 |
| | 5, 6 | TCM 11 | OBIX11 |
| | 7, 8 | TCM 12 | OBIX12 |
| IBIX4 | 1, 2 | TCM 13 | OBIX13 |
| | 3, 4 | TCM 14 | OBIX14 |
| | 5, 6 | TCM 15 | OBIX15 |
| | 7, 8 | TCM 16 | OBIX16 |

### *RPI-8 BIX wiring chart*

Table 56 lists the wiring chart for the RPI-8 BIX.

**Table 56** RPI-8 BIX wiring chart

| Pin | RPI Connector printed-circuit board | Label | Wire color |
|---|---|---|---|
| 26 | OBIX1 BS1 | -PWR | White-Blue |
| 1 | | | Blue-White |
| 27 | | TCM | White-Orange |
| 2 | | | Orange-White |
| 28 | | +PWR | White-Green |
| 3 | | | Green-White |
| 29 | OBIX2 BS2 | -PWR | White-Brown |
| 4 | | | Brown-White |
| 30 | | TCM | White-Slate |
| 5 | | | Slate-White |
| 31 | | +PWR | Red-Blue |
| 6 | | | Blue-Red |
| 32 | OBIX3 BS3 | -PWR | Red-Orange |
| 7 | | | Orange-Red |
| 33 | | TCM | Red-Green |
| 8 | | | Green-Red |
| 34 | | +PWR | Red-Brown |
| 9 | | | Brown-Red |
| 35 | OBIX4 BS4 | -PWR | Red-Slate |
| 10 | | | Slate-Red |
| 36 | | TCM | Black-Blue |
| 11 | | | Blue-Black |
| 37 | | +PWR | Black-Orange |
| 12 | | | Orange-Black |
| 38 | OBIX5 BS5 | -PWR | Black-Green |
| 13 | | | Green-Black |
| 39 | | TCM | Black-Brown |
| 14 | | | Brown-Black |
| 40 | | +PWR | Black-Slate |
| 15 | | | Slate-Black |

**Table 56** RPI-8 BIX wiring chart (Continued)

| Pin | RPI Connector printed-circuit board | Label | Wire color |
|---|---|---|---|
| 41 | OBIX6 BS6 | -PWR | Yellow-Blue |
| 16 | | | Blue-Yellow |
| 42 | | TCM | Yellow-Orange |
| 17 | | | Orange-Yellow |
| 43 | | +PWR | Yellow-Green |
| 18 | | | Green-Yellow |
| 44 | OBIX7 BS7 | -PWR | Yellow-Brown |
| 19 | | | Brown-Yellow |
| 45 | | TCM | Yellow-Slate |
| 20 | | | Slate-Yellow |
| 46 | | +PWR | Violet-Blue |
| 21 | | | Blue-Violet |
| 47 | OBIX8 BS8 | -PWR | Violet-Orange |
| 22 | | | Orange-Violet |
| 48 | | TCM | Violet-Green |
| 23 | | | Green-Violet |
| 49 | | +PWR | Violet-Brown |
| 24 | | | Brown-Violet |

### *RPI-8 BIX wiring chart*

Table 57 lists the wiring chart for the RPI-16 BIX.

**Table 57** RPI-16 BIX wiring chart

| Pin | RPI Connector printed-circuit board | Label | Wire color |
|---|---|---|---|
| 26 | OBIX9 BS9 | -PWR | White-Blue |
| 1 | | | Blue-White |
| 27 | | TCM | White-Orange |
| 2 | | | Orange-White |
| 28 | | +PWR | White-Green |
| 3 | | | Green-White |
| 29 | OBIX10 BS10 | -PWR | White-Brown |
| 4 | | | Brown-White |
| 30 | | TCM | White-Slate |
| 5 | | | Slate-White |
| 31 | | +PWR | Red-Blue |
| 6 | | | Blue-Red |

**Table 57** RPI-16 BIX wiring chart (Continued)

| Pin | RPI Connector printed-circuit board | Label | Wire color |
|---|---|---|---|
| 32 | OBIX11 BS11 | -PWR | Red-Orange |
| 7 | | | Orange-Red |
| 33 | | TCM | Red-Green |
| 8 | | | Green-Red |
| 34 | | +PWR | Red-Brown |
| 9 | | | Brown-Red |
| 35 | OBIX12 BS12 | -PWR | Red-Slate |
| 10 | | | Slate-Red |
| 36 | | TCM | Black-Blue |
| 11 | | | Blue-Black |
| 37 | | +PWR | Black-Orange |
| 12 | | | Orange-Black |
| 38 | OBIX13 BS13 | -PWR | Black-Green |
| 13 | | | Green-Black |
| 39 | | TCM | Black-Brown |
| 14 | | | Brown-Black |
| 40 | | +PWR | Black-Slate |
| 15 | | | Slate-Black |
| 41 | OBIX14 BS14 | -PWR | Yellow-Blue |
| 16 | | | Blue-Yellow |
| 42 | | TCM | Yellow-Orange |
| 17 | | | Orange-Yellow |
| 43 | | +PWR | Yellow-Green |
| 18 | | | Green-Yellow |
| 44 | OBIX15 BS15 | -PWR | Yellow-Brown |
| 19 | | | Brown-Yellow |
| 45 | | TCM | Yellow-Slate |
| 20 | | | Slate-Yellow |
| 46 | | +PWR | Violet-Blue |
| 21 | | | Blue-Violet |
| 47 | OBIX16 BS16 | -PWR | Violet-Orange |
| 22 | | | Orange-Violet |
| 48 | | TCM | Violet-Green |
| 23 | | | Green-Violet |
| 49 | | +PWR | Violet-Brown |
| 24 | | | Brown-Violet |

## Install a Companion base station

Before you install wireless equipment, ensure that a site planner determines base station locations and records the base station information in a provisioning record.

**Caution:** You must install all base stations within 1230 m (4000 ft., TCM wiring length) of the Business Communications Manager system or base station module.
To optimize seamless hand off, the difference in TCM wiring length between neighboring base stations must not exceed 300 m (1,000 ft.).

Before you install or move wireless equipment in the United States, check that you have approval from UTAM Inc.

The United States FCC has appointed UTAM Inc. as the body responsible for coordinating and verifying the installation or relocation of unlicensed, personal wireless communication devices. To comply with UTAM Inc., the system uses keys and credits to control user capacity and to ensure system location verification. You require these software keys and credits to activate Companion services. You purchase these credits at the time you place the order.

## Position the Companion base station

Avoid installing base stations on large concrete or marble columns because these columns affect radio coverage. If possible, place the base station a minimum of 1 m (40 in.) from these types of columns. Do not install a base station with the antenna housings near metal objects. Be careful not to damage existing wiring or panels.

Do not position base stations in ducts, plenums, or hollow spaces used to transport environmental air except where the duct, plenum or hollow space is created by a suspended ceiling having lay-in panels. When you need more than one base station in a cell to meet traffic requirements, position the base stations at the same cell center.

To place all base stations in the same cell center:

- for the USA, a minimum of 54 in. and a maximum of 9 ft. 9 in. distance between the center of one base station to the center of another
- for Canada, a minimum of 9 cm and a maximum of 1.5 m distance from edge to edge

**Warning:** Never install base stations in rows.

Position base stations away from office areas or areas with high portable telephone traffic. Table 58 on page 339 shows the minimum distance between office areas and base stations. Install the base station on the ceiling or high on walls to maintain these minimum distances.

**Table 58** Minimum distance between office areas and base stations

| Number of base stations in the cell | Minimum distance between office areas and base stations |
|---|---|
| 1 | 1 m (40 in.) |
| 2 | 1.4 m (56 in.) |
| 3 | 1.8 m (72 in.) |
| 4 | 2 m (80 in.) |

## Attach a Companion Base Station to a wall or ceiling

Install base stations on a wall or on a ceiling. When installing base stations on a wall, install them with their covers at the bottom, as shown in Figure 193 on page 340. Allow for clearances around the base station as indicated in Table 59.

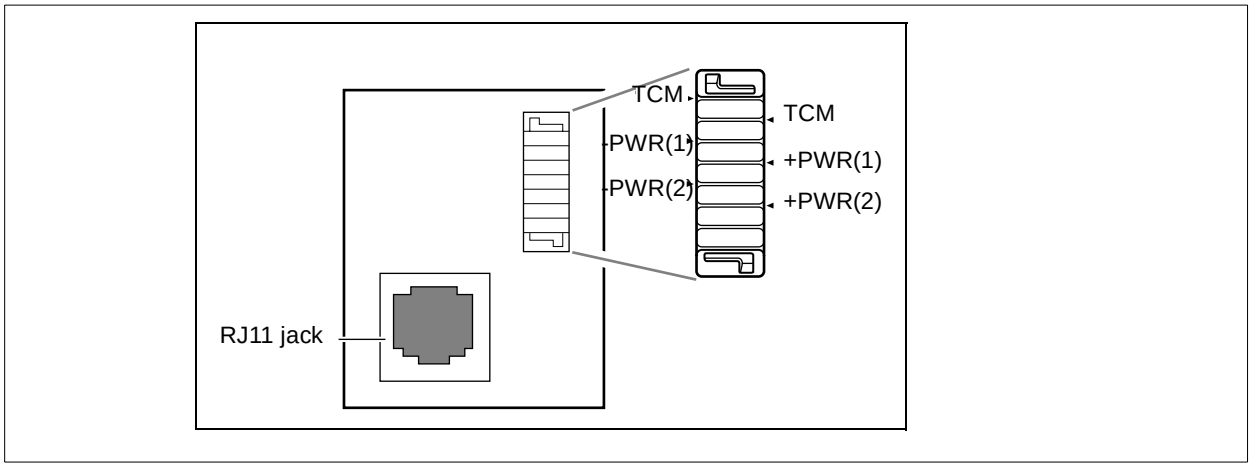
**Table 59** Clearance for the base stations

| Clearance conditions | Canada | USA |
|---|---|---|
| Clearance from all other objects | 9 cm | 3.5 in. |
| Vertical clearance from base station center to base station center | 27 cm | 54 in. |
| Horizontal clearance from base station center to base station center | 41 cm | 54 in. |

Use this procedure to install a base station:

1. Fasten the bracket into position using two #8 38-mm (1-1/2 in.) screws.
2. Route the cable from the Business Communications Manager system through the top or bottom opening.
3. Wind any excess cable around the posts, then fasten the cable under the strain relief.
4. Connect the wires to the BIX connector on the bracket termination board as shown in Figure 192.

**Figure 192** Bracket termination board



The polarity of the TCM connections is not important. If you connect the two power pairs to the bracket terminal board of the base station, you must connect the power pairs with the same polarity.

**Caution:** Ensure that the RPI is off before connecting power pairs to the base station.

5 Install the base station on the bracket. Snap it into position.

6 Connect the power RJ-11 jumper lead to the RJ-11 jacks on the termination board and the base station.

7 For plug top power supplies only, connect the power supply connector to the base station power connector. Make sure the base station uses a class 2 plug top power source only.

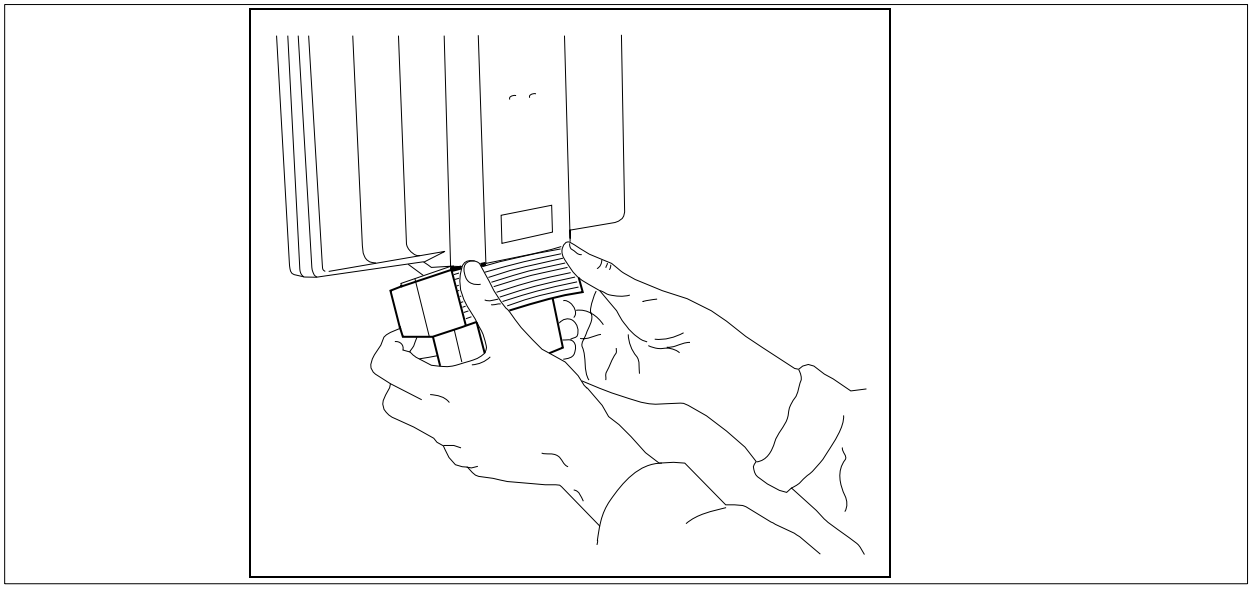
**Caution:** If you insert the power supply connector in the wrong direction, you can damage the plug top power supply and the base stations.
Position the power supply connector in the correct direction and push it into place.

8 In the space provided on the label attached to the lower right corner of the mounting bracket, record the port number used.

Include the marking information for all of the base stations on the completed installation floor plans.

9 Slide the cover on the bracket, using the guide to position it correctly. Refer to Figure 193.

**Figure 193** Slide the cover on bracket



10 Snap the cover into place.

11 This procedure is complete.

## Companion set registration

To use Companion portable telephones, you must first install radio base stations to transmit and receive radio signals to and from the portable telephones. See "Install a Companion base station" on page 338.

You use a different method to install portable telephones than desktop telephones. There are no direct connections between the portable telephones and the system. Do the following:

- Install the batteries and battery charging units for each portable, using the instructions that come with the portable.
- Enter the software keys for Companion in the Business Communications Manager Unified Manager under **Software** keys
- Register every Companion portable for use with the system.

**Note:** You must register a portable telephone before you can use it. By default, Companion portable telephones are not assigned extension numbers. The range of portable extensions available for wireless registration is 061 to 118. For more information about registering and programming Companion portables, see the *Business Communications Manager 2.5, Programming Operations Guide*.

## System restart

Use this procedure to perform a system restart.

**Warning:** A loss of unlicensed transition and management for microwave (UTAM) information occurs when upgrading US Business Communications Manager systems. You need UTAM Recovery Codes.

If you added a base station that requires a software update, the system begins downloading the software to the base station. The display shows **`BS-1 Dload Start`**.

1. Press **`CLEAR`** to clear the message. When the base station software finishes downloading, the **`BS-1 Dload Done`** appears.
2. Press **`CLEAR`** to clear the message. Some base stations do not power up at the same time, and this message repeats at the beginning of each download.

In the United States, the display shows one of the messages listed in Table 60 after restarting:

**Table 60** UTAM messages

| If display shows | See |
|---|---|
| UTAM code req'd | System logical identifier (LID) information |
| UTAM test failed | See alarm codes in the Windows NT event log. |

3. This procedure is complete.

# Install an external antenna and lightning surge protection

You can use external antennas to provide a broad range for your Companion system. Ensure that any external installations comply with local regulations and include lightning surge protection.

## Read before you install equipment

- Install the antenna vertically. For more information, refer to Figure 194 on page 343.
- Use #8, 12 mm to 50 mm ($^1/_2$ in. to 2 in.) screws to install the antenna bracket and lightning surge protector bracket to the wall.
- Ensure the antenna is clear of any adjacent obstruction or metal objects. If you use more than one external antenna at a cell center, separate the antennas at by least 1 m (40 in.) to avoid radio interference problems.
- When running the coaxial cable inside or outside, be careful not to damage the cable. Cable damage affects performance. The minimum recommended bending radius is 200 mm (8 in.).
- The coaxial cable length must not exceed 10 m (33 ft).
- Use RG-58AU coaxial cables to connect the antennas to the base stations.
- You can attach a proprietary extension cable between the lightning surge protector and the antenna or between the lightning surge protector and the base station. Make sure you keep the total cable length as short as possible and use only the recommended extension cable when necessary.
- Install a lightning surge protector for each external antenna.

**Warning:** FCC requirements.
In the United States, the FCC requires that you connect only approved antennas to Companion base stations.

**Caution:** Do not install the outdoor antenna or the lightning surge protector during an electrical storm.
Always turn off the base station power before connecting the coaxial cable of an outdoor antenna.
Always install the lightning surge protector at the cable entry point into the building.
Connect the lightning surge protector to ground before you connect the coaxial cable.

## Antenna installation (United States of America)

The following points cover special information about installations in the United States of America.

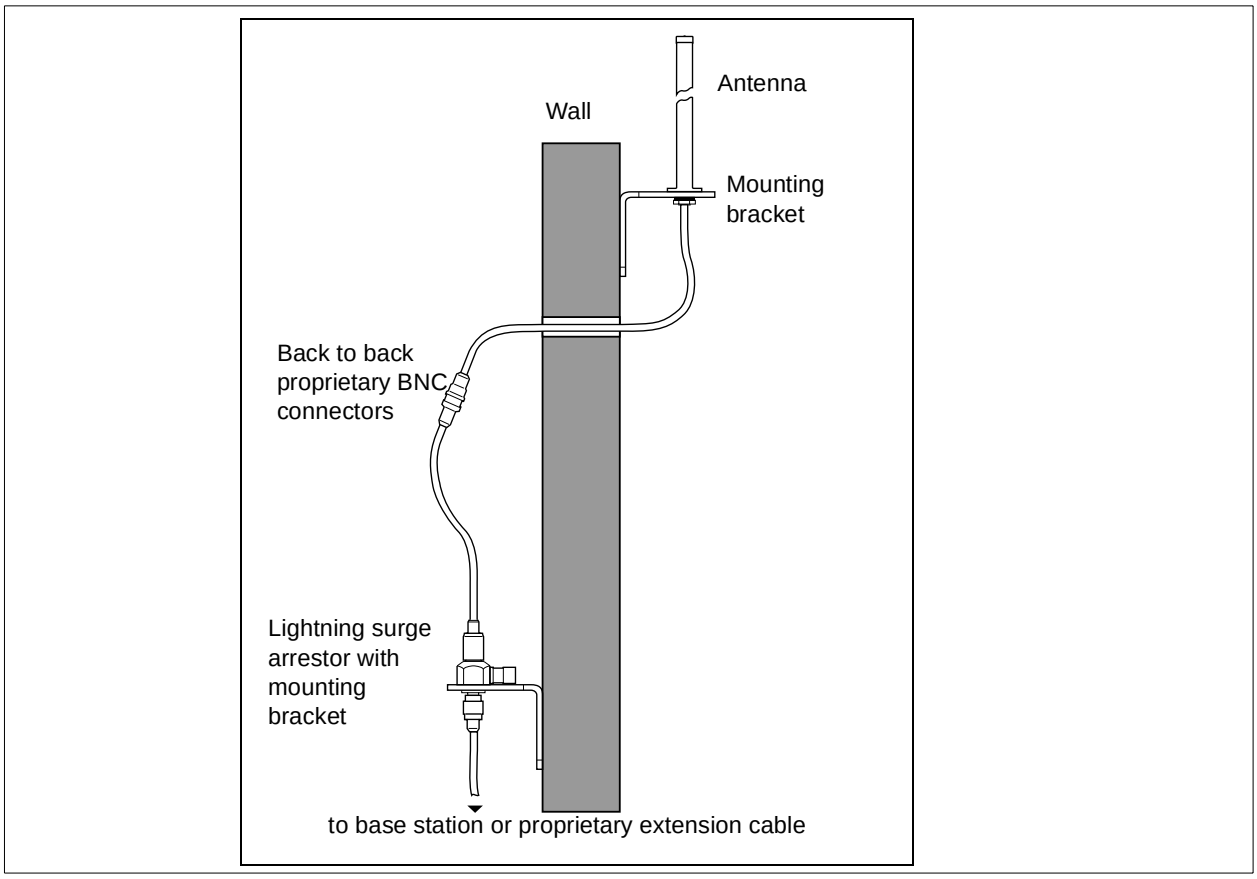
- The outdoor antenna connectors on the base station are special proprietary BNC connectors.
- Antennas are supplied with cables attached and terminated with special proprietary BNC plugs to join with the connector on the base station.
- Cables are not supplied with outdoor antennas.

### *Install an outdoor antenna (USA)*

Use the procedure in this section to install an outdoor antenna. Perform the following before you install an outdoor antenna:

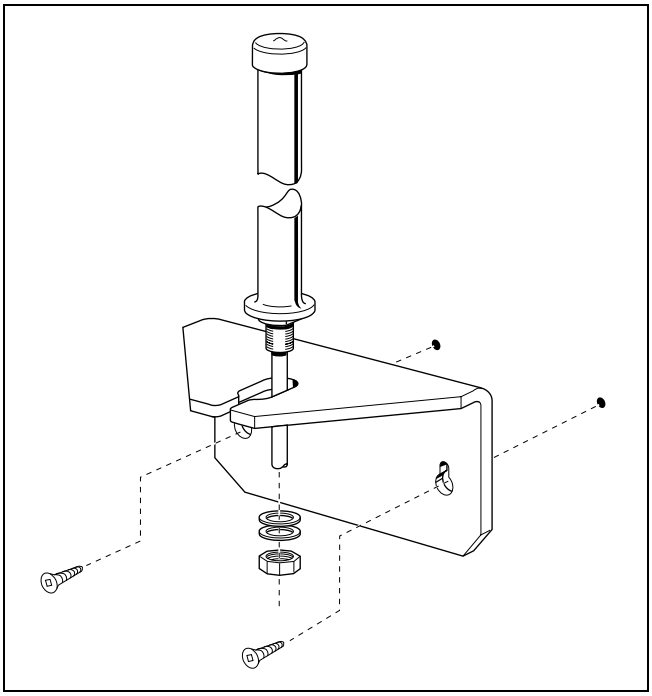
- Locate the antenna on the external wall of the building.
- Keep the outdoor antenna as close as possible to the base station connected to it. The base station must always be inside the building. The recommended installation height for the antenna is 13 to 16 ft. above ground.
- Always install a lightning surge protector between an outdoor antenna and a base station. Refer to Figure 194.

**Figure 194** Installed antenna and lightning surge protectors (USA)




1. Make a hole for the coaxial cable.
2. Install conduit for the antenna cable according to local building and wiring codes.
3. Screw the antenna bracket to the wall so that the antenna is vertical on the exterior wall of the building.
4. Loosen the nut on the antenna.
5. Slide the antenna into the slot of the bracket and tighten the nut. Refer to Figure 195.

**Figure 195** Antenna with antenna bracket (USA)



6 Feed the coaxial cable through the wall to the lightning surge protector on the interior wall.

7 This procedure is complete.

## Install a lightning surge protector (USA)

Use the procedure in this section to install the lightning surge protector. The surge protector prevents damage to the Companion components due to electrical surges caused by lighting.

1 Install the lightning surge protector on the interior wall as close as possible to the entry point of the coaxial cable from the outdoor antenna.

   Before you connect the ground lead to the lightning surge protector, attach the ground lead to an approved ground. Refer to the Wiring information tips box on the next page.

2 Route and connect the coaxial cable from the outdoor antenna to the lightning surge protector.

3 Route and connect the coaxial cable from the lightning surge protector to the appropriate base station connector. Refer to Figure 196 on page 345.

**Tip:** Wiring information

The recommended wire gauge is 6 AWG.

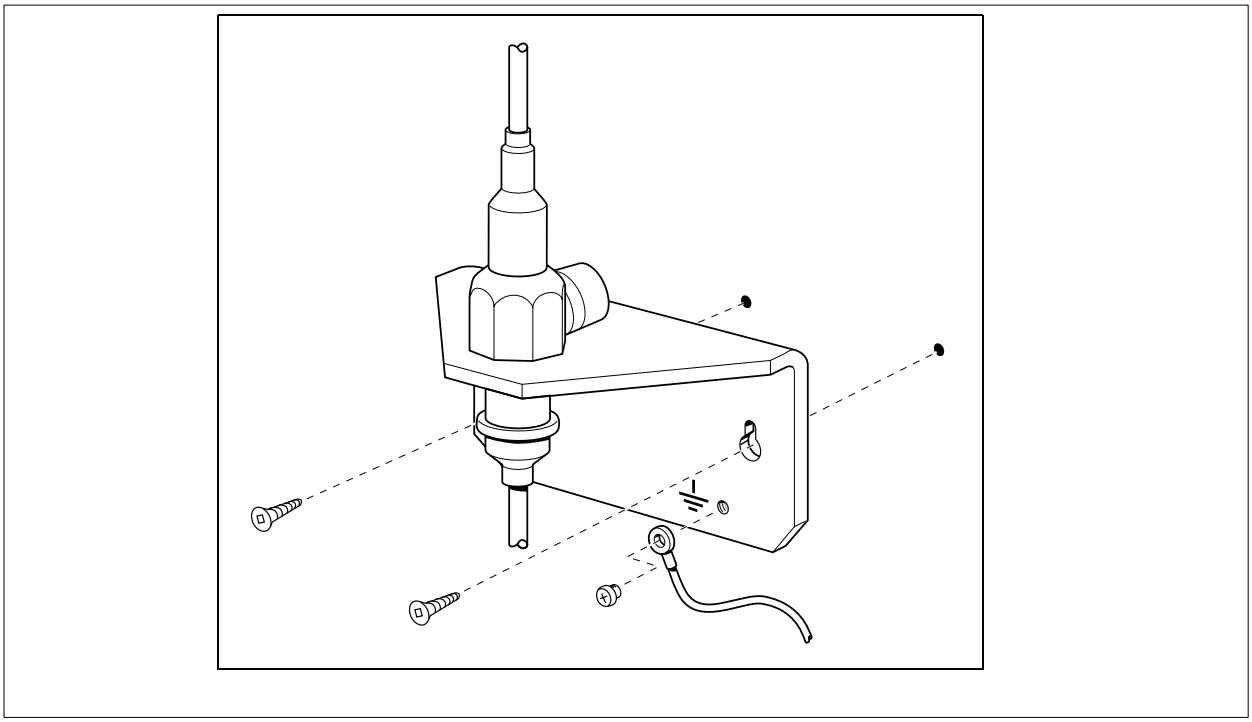
Connect the ground lead to the building ground. Do not connect to a ground rod or series of ground rods.

If you cannot connect the ground lead to the building ground, connect the ground lead to the metal frame of the building. The connection must be no more than six to 10 ft.

You can connect the ground lead to the 120 V ac conduit, which is connected to the building ground. However, using the ac conduit is not the preferred method of installation.

The connector between the antenna and the lightning surge protector and between the lightning surge protector and the base station is a proprietary BNC connector. You must align the BNC connectors before you can make the connection.

**Figure 196** Lightning surge protector and bracket (USA)



**4** This procedure is complete.

## Install an antenna (Canada)

There are three types of external antennas available in Canada:

- indoor directional antenna
- indoor omnidirectional antenna
- outdoor omnidirectional antenna

Each type of installation requires a specific installation technique. As well, you must install a lightning surge protector for every outdoor antenna installed.

### *Outdoor requirements*

Before you install the antenna, ensure that your plan meets the following requirements:

- If you are installing an outdoor antenna on a metal surface greater than 18 cm (7 in.) in diameter, position the antenna perpendicular to the surface.
- When running the coaxial cable inside or outside, be careful not to damage the cable, which affects its performance. The minimum recommended bending radius is 20 mm (0.8 in.).
- Always ensure that the antenna is clear of any adjacent obstruction or metal objects. If you use more than one outdoor antenna at a cell center, separate the antennas at by least 0.5 m (20 in.) to avoid radio interference problems.
- Use RG-58/U coaxial cables to connect the antennas to the base stations.

**Caution:** Use only passive antennas to connect to the Companion base stations. The coaxial cable you use to connect the external antenna to a Companion base station must have an impedance of 50 ohms.

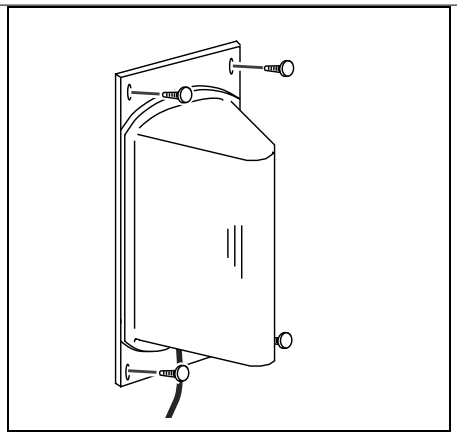
### *Installing an Indoor Directional Antenna*

The indoor directional antenna has a backplate that allows for easy installation on a wall. The antenna is installed half way between the floor and the ceiling.

For some applications (for example, a stairwell), you can install the antenna on the ceiling.

**1** Use four screws to install the antenna. Refer to Figure 197.

**Figure 197** Indoor directional external antenna (Canada)



**2** Fasten the cable to the mounting surface to prevent stress on the coaxial cable.

**3** Connect the antenna to the appropriate base station radio.

**Note:** The coaxial cable length must not exceed 10 m (33 ft.).

**4** This procedure is complete.

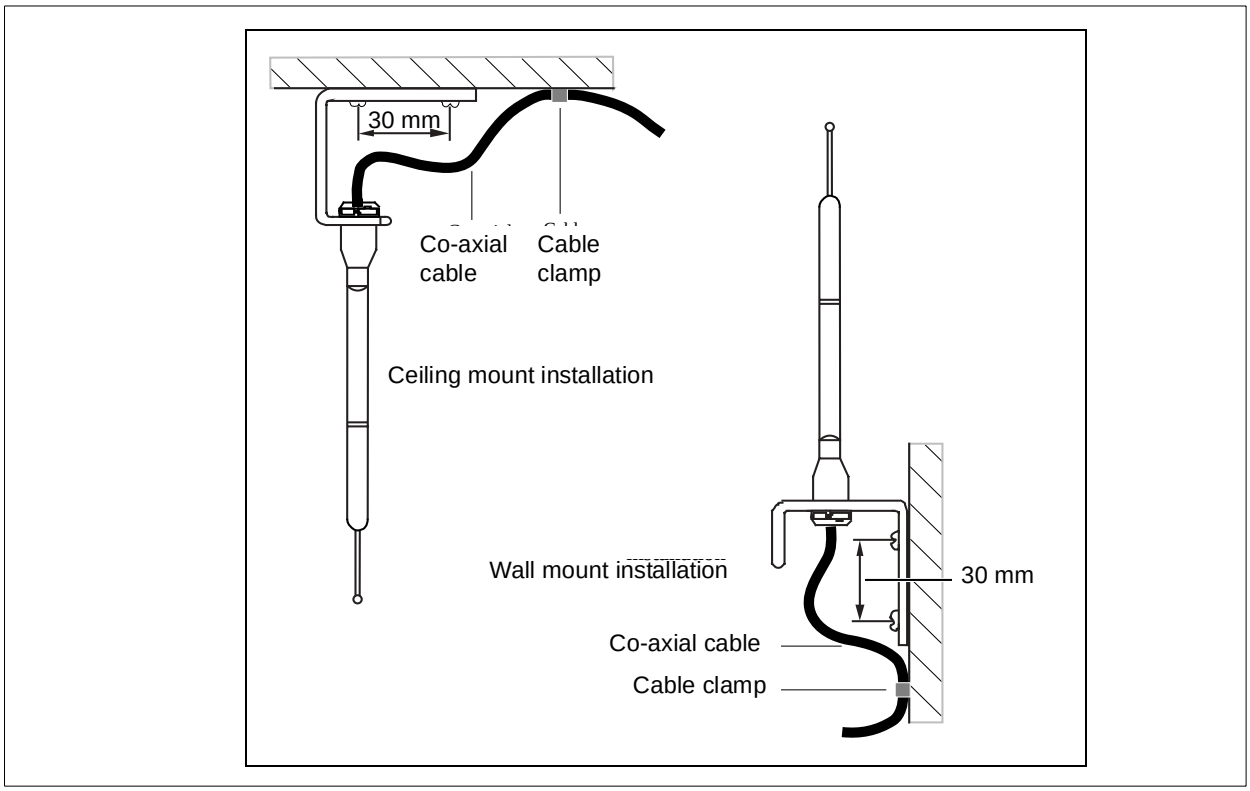
### *Install an indoor omnidirectional antenna (Canada)*

Use the procedure in this section to install an indoor, omnidirectional antenna (Canada only). Use the following guidelines to install an indoor omnidirectional antenna:

- Use the bracket supplied to install the antenna on a wall or ceiling. This bracket provides the necessary clearance between the floor or wall and the antenna.
- Mount the bracket so that the external antenna is vertical. The recommended installation position on a wall is halfway between the floor and the ceiling.

Figure 198 shows the two methods of installing the indoor omnidirectional external antenna.

**Figure 198** Indoor omnidirectional external antenna (Canada)




1. Insert the antenna in the bracket so that the antenna is vertical.
2. Use two screws to install the bracket to the wall or ceiling.
3. Clamp the cable to the mounting surface to prevent cable stress on the coaxial cable.
4. Connect the external antenna to the appropriate base station.

**Note:** The length of the coaxial cable must not exceed 10 m (33 ft.).

5. This procedure is complete.

### *Install an outdoor omnidirectional antenna (Canada)*

Use the procedure in this section to install an outdoor, omnidirectional antenna (Canada only). Use the following guidelines to install an outdoor omnidirectional antenna:

- Locate the antenna on the external wall of the building.

**Note:** You must install the antenna on a vertical surface.

- Keep the outdoor omnidirectional external antenna as close as possible to the base station. The base station itself must always be located inside the building.
- The recommended installation height is 4 m (13 ft) to 5 m (16.5 ft) above ground level.
- Always install a surge protector between an outdoor omnidirectional external antenna and a base station.

**Note:** The connector on the outdoor omnidirectional external antenna is a TNC female connector. To connect the antenna, you need an adapter to connect the TNC connector to the BNC coaxial cables or a coaxial cable with a TNC male connector on one end and BNC male connector on the other end.

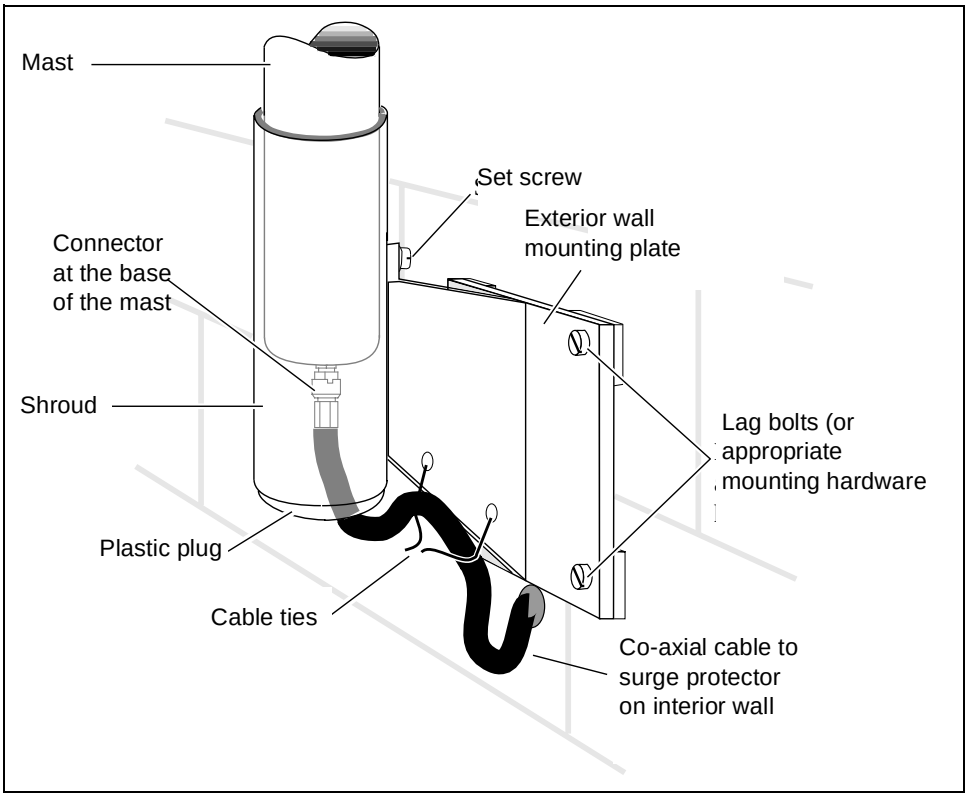
**Caution:** Fit lightning protection to the antenna if appropriate.
See “Install a lightning surge protector (Canada)” on page 351 for more information.

Important points to remember:

- Do not install the external antenna or the lightning surge protector during an electrical storm.
- Always turn off the base station power before connecting the coaxial cable of an outdoor antenna.
- Always install the antenna at the cable entry point into the building.
- Connect the lightning surge protector to ground before connecting the coaxial cable.

1 Screw the antenna mounting plate vertically to the exterior wall of the building with lag bolts or other appropriate hardware. Figure 199 shows how to fasten the mounting plate.

**Figure 199** Install the outdoor omnidirectional external antenna (Canada)




2 Feed one end of the coaxial cable up through the bottom of the antenna cover and attach the BNC connector to the base of the mast.

3 Slide the mast down into the cover until it fits.

4 Rotate the mast until the threaded hole in the base of the mast aligns with the set screw hole in the cover. Tighten the set screw.

5 Route the coaxial cable along the bottom edge of the plate between the cover and the wall plate.

**Note:** The total length of the coaxial cables from the outdoor antenna to the base station must not exceed 10 m (33 ft.).

6 Tie the cable to the mounting plate.

7 Insert the plastic plug into the base of the cover to keep moisture out.

8 Feed the coaxial cable through the wall to the surge protector on the interior wall.

9 This procedure is complete.

### *Install a lightning surge protector (Canada)*

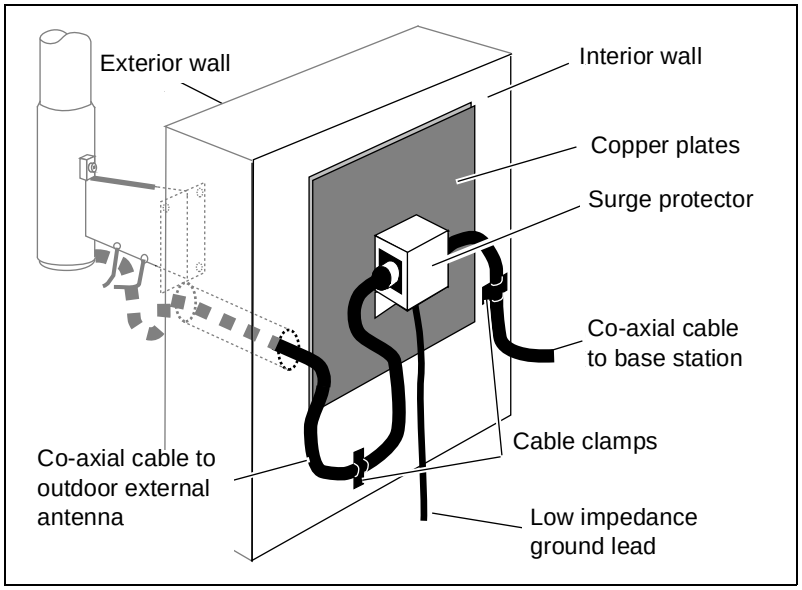
Use the procedure in this section to install a lightning surge protector (Canada only).

Install the lightning surge protector for the outdoor omnidirectional external antenna to protect it from electrical surges. The recommended lightning surge protector is part number A0382082. Refer to the installation instructions from the manufacturer for more details on its installation. To install a lightning surge protector, follow these steps:

**1** Install the surge protector on the interior wall as close as possible to the entry point of the coaxial cable from the outdoor antenna.

Figure 200 shows where to locate the surge protector. Follow the installation instructions provided with the surge protector.

**Figure 200** Install the lightning surge protector (Canada)




**2** Attach the ground lead to an approved ground, before you connect the ground lead to the surge protector.

The recommended wire gauge is 6 AWG (4 mm). Connect the ground lead to the building ground. Do not connect to a ground rod or series of ground rods. If you cannot connect the ground lead to the building ground, connect the ground lead to the metal frame of the building. The connection must be no more than 2 m (6.5 ft.) to 3 m (10 ft.) long.

You can connect the ground lead to the 120 V ac conduit (which is connected to the building ground). However, Nortel Networks does not recommend using the 120 V ac conduit.

**3** Route and connect the coaxial cable from the outdoor antenna to the surge protector.

4 Route and connect the coaxial cable from the surge protector to the appropriate base station BNC connector.

**Note:** The total length of the coaxial cables from the outdoor antenna to the base station must not exceed 10 m (33 ft.).

5 This procedure is complete.

# Install DECT Systems

The DECT system requires a DECT media bay module to allow communication between the DECT handsets and the Business Communications Manager. The module installs in the Business Communications Manager or expansion unit. A maximum of eight base stations, which are distributed throughout the transmission area, are connected to the module. After this step is complete, the handsets are subscribed to the Business Communications Manager system.

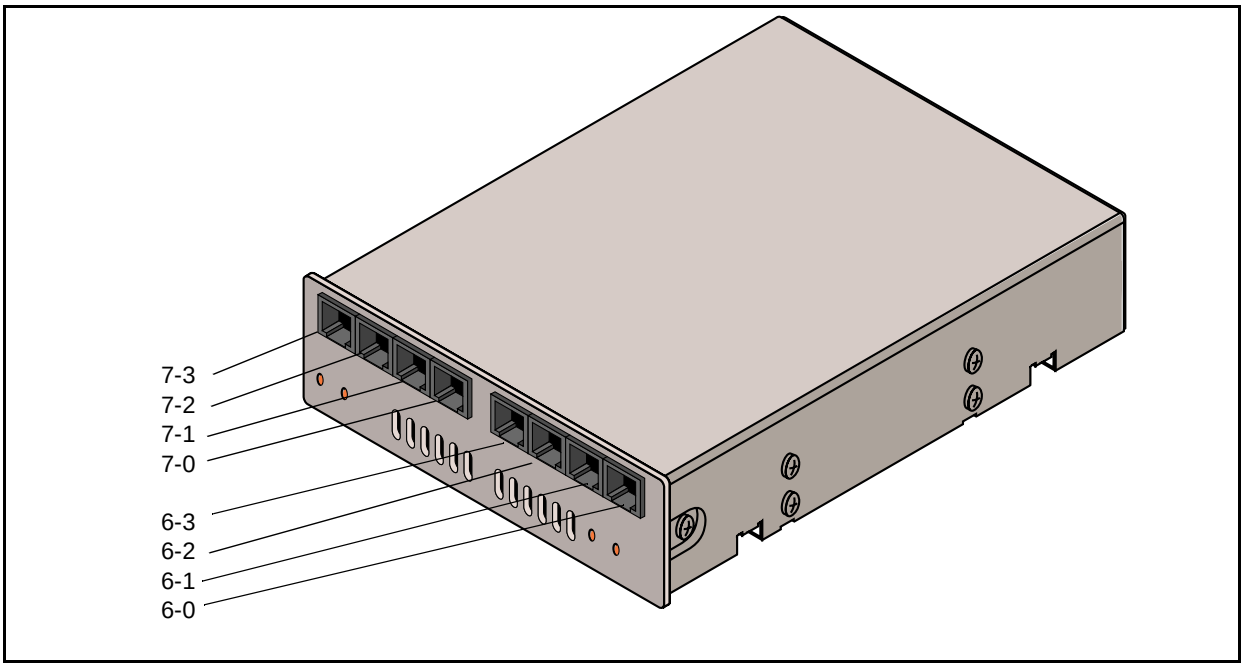
For detailed installation refer to the *Business Communications Manager 3.0 DECT Installation and Maintenance Guide*.

Each jack on the DECT module corresponds to an internal port on the DECT module. These numbers are used to access the base stations when you disable them to turn mobile recording on when you subscribe new handsets,.

**Warning:** Plug each base station in sequentially. Ensure that each base station starts to perform the startup sequence before plugging in the next base station. You can check base station states through the DECT module interface.

**Warning:** For detailed information, refer to the *DECT Installation and Maintenance Guide*. Figure 201 demonstrates these connections.

**Figure 201** R451 connectors on the DECT media bay module



# Chapter 13
# Install Analog Terminal Adapters (ATA)

This chapter provides installation instructions for the Analog Terminal Adapter 2 (ATA 2) and contains the following primary topics:


- "Prepare for Installation" on page 355
- "Connect the ATA 2" on page 359
- "Mount the ATA 2" on page 360
- "ATA 2 Data Communication" on page 363
- "Install a Data Communication Device" on page 364


The ATA 2 connects a standard analog voice device or data communication device to the Business Communications Manager system. Examples of analog voice devices are analog telephones and answering machines. Examples of data communication devices are modems and fax machines.

The ATA 2 provides on-premises service only (unexposed plant only).

## Prepare for Installation

Before you install an ATA 2 device, ensure that your system and environment meet the requirements listed in this section. This section describes the following:


- "Environmental requirements" on page 355
- "Operating requirements" on page 356
- "Analog transmission parameters" on page 356


### Environmental requirements

Check the following environment requirements for the ATA 2:

| | |
|---|---|
| Line voltage (120 V) | 102 – 132 V ac |
| Line voltage (230 V) | 207 – 253 V ac |
| Temperature | 0 – 50°C (32 – 122°F) |
| Relative humidity | 5% – 95% non-condensing |
| Bridge taps | Not allowed between the Business Communications Manager system loading coils and ATA 2 |

## Operating requirements

The following are requirements for operating other analog or data communication devices:

| | |
|---|---|
| Ringing signal (North America):<br>Frequency Voltage: | 20 Hz ± 1 Hz<br>80 V rms ± 10% |
| Ringing signal (Europe):<br>Frequency voltage: | 25 Hz ± 1 Hz<br>75 V rms ± 10% |
| Ringer equivalence number | 3 |
| Battery feed voltage | - 48 V dc ± 10% |
| Loop current | 20 mA minimum |
| FIC code | OL13ABC |
| ATA 2 to Business Communications Manager system loop resistance (cable only) | 135 ohms maximum (for example: 800 m of 0.5 mm wire or 2,600 ft. of 24 AWG wire) |
| Analog loop resistance on terminal side for voice applications (cable only) | 1,300 ohms maximum (for example: 4,600 m of 0.4 mm wire or 15,000 ft. of 26 AWG wire) |
| Analog loop resistance on terminal for data applications (cable only) | 200 ohms maximum (for example: 730 m of 0.4 mm wire side or 2,400 ft. of 26 AWG wire) |

## Analog transmission parameters

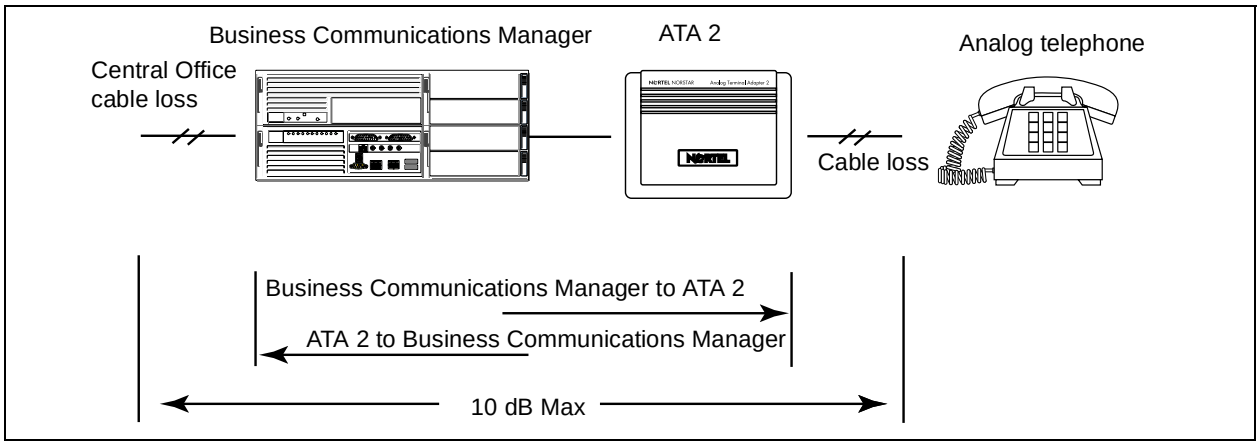
**(North American systems only)**

The following are the required analog parameters for an ATA2:

| | |
|---|---|
| Input impedance at tip and ring | 600 ohms |
| Return loss | > 20 dB for 200 to 3,400 Hz (when Network terminated with 600 ohms) |
| Insertion loss on an internal call | ATA 2 to Business Communications Manager system loss 3.0 dB ± 0.5 dB |
| Insertion loss on an external call | ATA 2 to Business Communications Manager system loss 2.2 dB ± 1.0 dB<br>Business Communications Manager system to ATA 2 loss 0.5 dB ± 1.0 dB |

The maximum loss for ATA 2-to-central office (CO) configuration, shown in Figure 202 on page 357, must not exceed 10 dB.

**Figure 202** Insertion Loss from the CO to the analog telephone




| | |
|---|---|
| Longitudinal balance to ground | 50 dB<br>60 to 4,000 Hz<br>With IEEE 455-1976 test |
| Overload level | 3 dB |

# Measure insertion loss

Measure the total insertion loss between the CO and analog device by using standard dial-up test lines with a transmission test set (for example, Hewlett-Packard 4935A transmission test set).

This section provides the following procedures:

- "Measure insertion loss between the central office and analog device" on page 357
- "Measure insertion loss from the analog device to central office" on page 358

## Measure insertion loss between the central office and analog device

Use this procedure to measure the insertion loss from the CO to the analog device.

1. Establish a connection to the 1 mW, 1 kHz, CO service line with a analog telephone attached to the ATA 2.
2. Ensure that the analog port terminates correctly in 600 ohms:
   a. Replace the analog telephone with the test set
   b. Use RECEIVE/600 OHM/HOLD mode on the test set
3. Ensure that the test set connects in parallel to the service line before removing the analog telephone or the line drops.
4. Remove the analog telephone.

5 Measure the 1 kHz tone at the far end of the analog port, which is where the analog loop ends and where the analog device connects.)

**Note:** The tone must be greater than - 10 dB (for example, - 9 dB is acceptable).

6 This procedure is complete.

## Measure insertion loss from the analog device to central office

Use this procedure to measure the insertion loss from the analog device to the CO:

1 Establish a connection to a silent termination on the CO service line with an analog telephone attached to the ATA 2.

2 Make sure the analog port terminates correctly in 600 ohms by:

- replacing the analog telephone with the test set
- using TRANSMIT/600 OHM/HOLD mode on the test set

3 Make sure the test set connects in parallel to the service line before removing the analog telephone or the line drops.

4 Remove the analog telephone.

5 Introduce a 1 kHz tone into the analog line at - 10 dBm, and measure the level at the CO exchange.

**Note:** The difference in levels is the transmit loss, which must be less than 10 dB (for example, 9 dB is acceptable).

6 This procedure is complete.

# Connect the ATA 2

After you have determined that the proper environment exists, connect the ATA 2 to the line and set (see Figure 203).

**Figure 203** Analog telephone installation overview

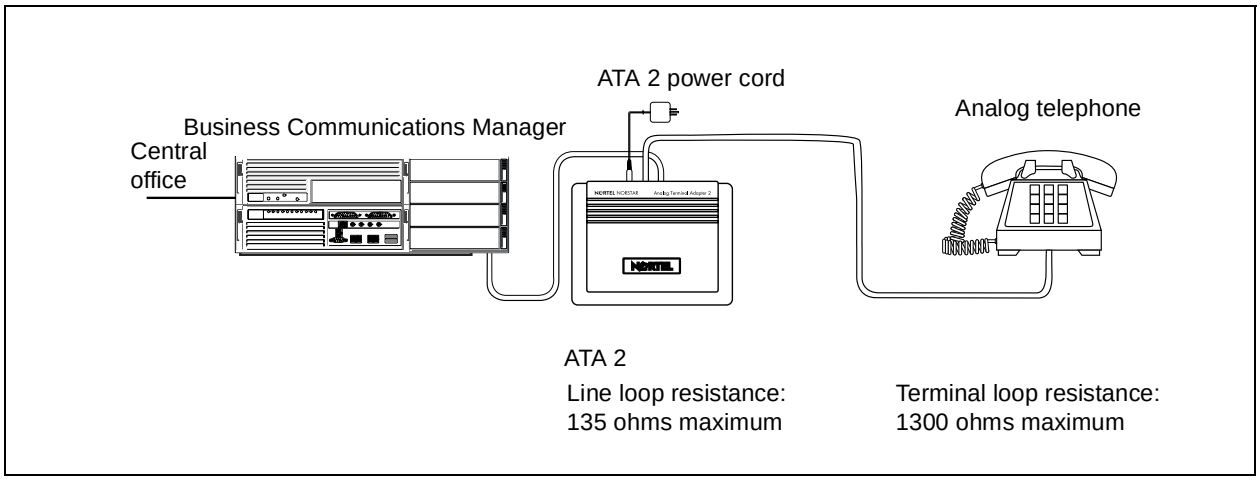
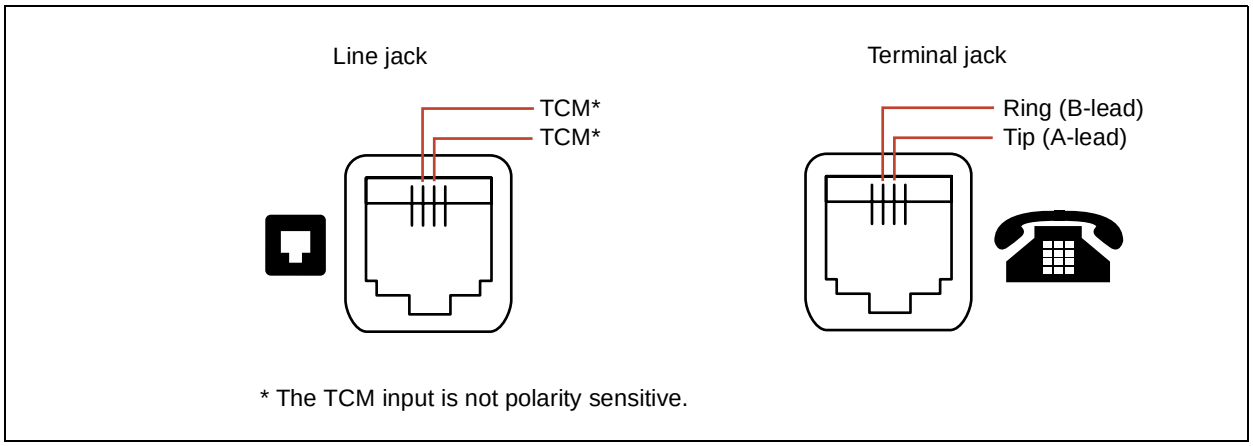



Figure 204 shows the pinouts for the connection cables.

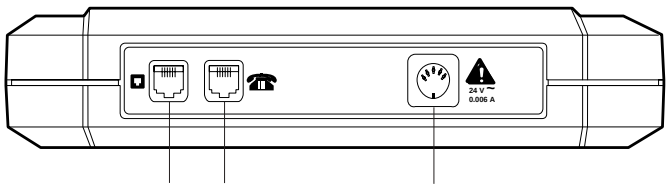
**Figure 204** ATA 2 pin outs



Use this procedure to connect the cable.

1 Connect one end of a line cord to the ATA2 Terminal jack. Refer to Figure 205.

**Figure 205** ATA 2 top view




2 Connect the other end to your telephone, modem or FAX.

3 Connect one end of a line cord to the ATA2 Line jack.

4 Connect the other end to an available station port on the Business Communications Manager.

5 For a 120 V or 230 V system, plug the DIN connector of the power supply cord into the power supply connector receptacle. Plug the adapter into a standard ac outlet.

**Caution:** In North America, the ATA 2 must be powered from a Class 2 power source that is UL and CSA approved.
In Europe, the ATA 2 must be powered from a Class II power source that is CE marked.

6 This procedure is complete.

# Mount, Configure, and Test the BCM ATA 2

This section describes how to do following:


- "Mount the ATA 2" on page 360
- "Determine the ATA 2 extension number" on page 361
- "Configure the ATA 2" on page 362
- "Test the ATA 2" on page 362


## Mount the ATA 2

Use this procedure to mount the unit on a wall after the ATA 2 is correctly connected.

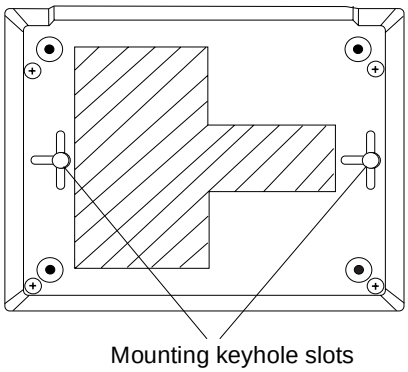
1 When using 0.5 mm wire (24 AWG), select a location within 800 m (2,600 ft.) of the Business Communications Manager system.

2 Allow 12.5 cm (5 in.) clearance for the line jack, terminal jack, and power supply connector.

3 Screw two 4 mm (#8) screws into the wall, 130 mm (5 1/4 in.) away from each other. Leave 6 mm (1/4 in.) of the two screws showing.

4 Align the slots at the back of the ATA 2 unit over the screws. Push the unit against the wall. The line jack, terminal jack, and power supply connector must be at the top of the ATA 2. Refer to Figure 206 on page 361.

**Figure 206** ATA 2 back view




5 This procedure is complete.

## Determine the ATA 2 extension number

Use this procedure to determine the extension number for every ATA 2. Perform this procedure before performing administration.

1 Connect a analog telephone to the ATA 2.

2 Lift the handset.

3 If you do not hear dial tone, press **LINK** 9 to access an intercom line.

**Note: LINK** appears as **RECALL** on some telephones. If you are using a telephone without a **LINK** or **RECALL** button, refer to the *ATA 2 User Guide* for details.

Some phones have a Flash button, which is the equivalent to **LINK** or **RECALL**.

4 Dial the extension number of an Business Communications Manager telephone with a display. If you hear a busy signal, repeat steps 3 and 4 using a different extension number.

5 When the telephone rings, the display shows: Set <nn> calling.

6 The number that appears on the display is the ATA 2 extension number. Record the extension number.

**Note:** The Automatic Set Relocation feature works with ATA 2.

7 This procedure is complete.

## Configure the ATA 2

Use this procedure to configure the ATA 2 using the Business Communications Manager Unified Manager. For detailed information about using Unified Manager, refer to the *Business Communications Manager 2.5, Programming Operations Guide*.

1 Open the Unified Manager.

2 Assign the following line features to the ATA 2:

- assign one external line to the telephone
- set ringing for this line ON or OFF, as required
- assign one intercom line
- assign Held Line Reminder to ON
- disable Full Handsfree
- disable Handsfree Answerback
- disable Paging Reception

3 Assign an external line, an intercom line, or a line pool as the Prime Line for the ATA 2.

**Note:** Direct access to a CO line for modems, fax machines and credit card verification machines is possible using the Hotline feature. For direct access to a CO line, program an external line as the Hotline. Enter a pause to replace the telephone number for the Hotline (F78).

4 Exit the Unified Manager.

5 Set the ATA 2 to Tones ON when you are assigning an analog voice device.

Set the ATA 2 to Tones OFF when you are assigning a data communication device.

For details, refer to the *ATA 2 User Guide*. The default is Tones OFF.

6 This procedure is complete.

## Test the ATA 2

Use this procedure to confirm that the ATA 2 is operating by connecting an analog telephone to the ATA 2.

1 Make an internal call and an external call using the telephone connected to the ATA 2.

2 Call the ATA 2 from an system telephone. Refer to the *ATA 2 User Guide* for details.

3 This procedure is complete.

# ATA 2 Data Communication

The ATA 2 connects a standard analog data device, such as a FAX or modem, to the Business Communications Manager system. This section shows the additional steps required to install ATA 2 for data communication.

## Data transmission requirements

When using the ATA 2 for data transmission, the analog loop resistance must not exceed 200 ohms (for example, 730 m of 0.4 mm wire or 2400 ft. of 26 AWG wire).

The external line assigned to the ATA 2 must follow the transmission network requirements described in the data communication device specifications.

Transmission rates (baud) over 1,200 bps require a modulation design compatible with the telephone line bandwidth. Use a conditioned external line to prevent data corruption during transmission.

**Note:** Maximum loss from the ATA 2 analog terminal to the CO must be 10 dB or less at 1 kHz. If the loss exceeds this limit, condition the line. This loss ensures correct data transmission for different types of data terminals.

## FAX and modem transmission compatibility

The ATA 2 is compatible with all commercial FAX and modem protocols. When connected to an ATA 2, the Business Communications Manager system supports data transmission rates up to and and including 28.8 kbit/s.

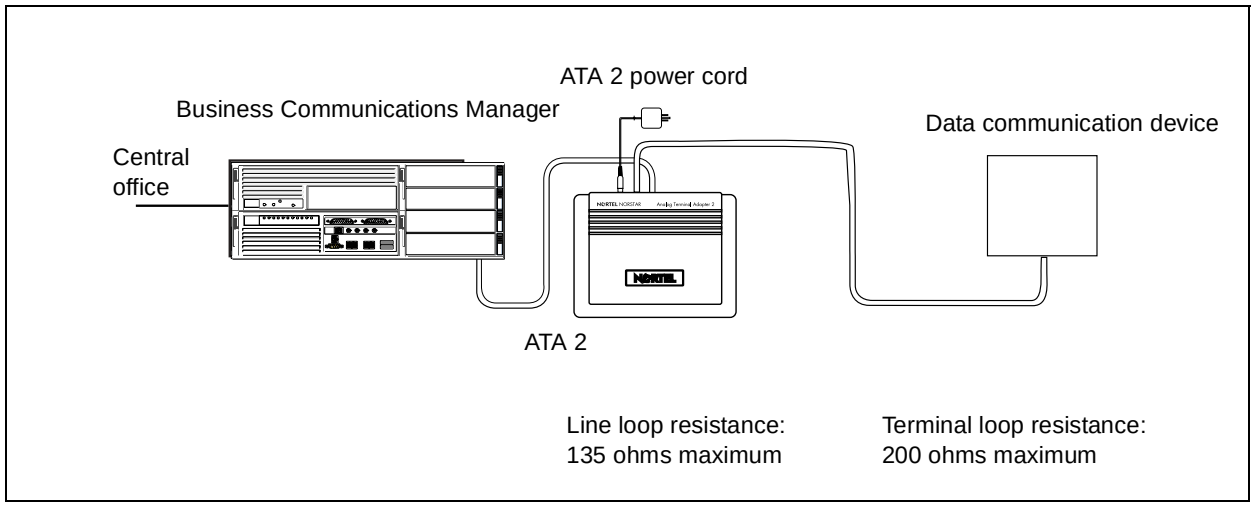
**Note:** Nortel Networks cannot guarantee the maximum data transmission rate because the maximum rate is subject to the quality of the end-to-end channel.

# Install a Data Communication Device

Use this procedure to install an ATA 2 to a data communication device.

Figure 207 shows the hardware configuration for connecting a data communication device through an ATA 2 to the Business Communications Manager.

**Figure 207** Data communication device installation overview




1 Connect an analog telephone to the ATA 2.

2 Check that the ATA 2 is in the Tones OFF mode, lift the handset, and press **LINK** 18.

**Note: LINK** appears as **RECALL** on some telephones. If you are using a telephone without a **LINK** or **RECALL** button, refer to the *ATA 2 User Guide* for details.

3 Make sure the terminal loop resistance is less than or equal to 200 ohms.

**Note:** If necessary, install the ATA 2 near to the data communication device to maintain a maximum loop resistance of less than 200 ohms. When using 0.4 mm wire (26 AWG), the ATA 2 must be within 800 m (2,600 ft.) of the Business Communications Manager system.

4 Disconnect the analog telephone from the ATA 2.

5 Plug the data communication device into ATA 2.

6 This procedure is complete.

# Chapter 14
# Install Optional Telephony Equipment

Use the procedures described in this chapter to connect the optional ringer, page, and music telephony equipment to the media services card (MSC) connectors. Locate and use the MSC connectors on the front of the Business Communications Manager base function tray. Refer to "Media services card (MSC)" on page 56.

This section describes the following main topics:


- "Media Service Card Connections" on page 365


## Media Service Card Connections

This section provides procedures on how to install MSC faceplate optional telephony equipment. Refer to the following procedures:


- "Install an auxiliary ringer" on page 365
- "Activate auxiliary ringer programming" on page 366
- "Connect the external paging system" on page 366
- "Connect an external music source" on page 368

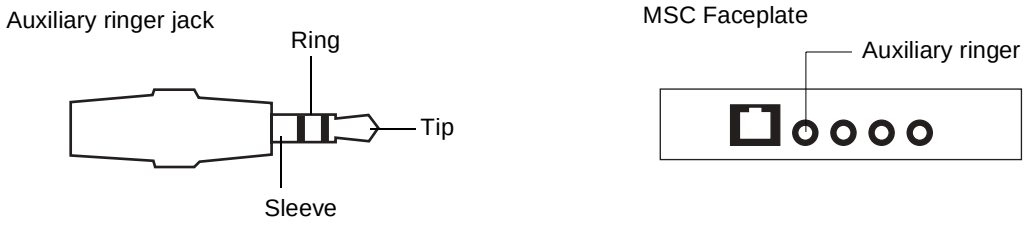

### Install an auxiliary ringer

An auxiliary ringer is a customer-supplied piece of hardware that provides external ringing capability to telephones on the Business Communications Manager, if the telephones are set to allow it.

Use this procedure to install an auxiliary ringer.

1. Use the installation instructions that came with the ringer hardware to install the auxiliary ringer.
2. Connect the ringer generator miniature jack to the auxiliary ringer output on the MSC. Refer to Figure 208.

**Figure 208** Auxiliary ringer jack




**Tip**: Auxiliary relay output
**Ring**: Auxiliary relay output
**Sleeve**: Ground

**Warning:** The auxiliary ringer must not be connected to exposed plant. The ringer must not draw more than 50 mA from a 40 V DC source.

## Activate auxiliary ringer programming

You can activate the auxiliary ringer by setting auxiliary ring for specific external lines and Business Communications Manager telephones. Refer to the *Business Communications Manager 2.5, Programming Operations Guide* for programming details.

## Connect the external paging system

You can connect a customer-supplied external paging system to provide paging over external loudspeakers.

Ensure the paging system follows these guidelines:

- The paging output from the MSC is 100 mV rms across an input impedance of 600 Ω
- The output level is 0 dBm0 with reference to 600 ohms, for a PCM encoded signal at 0 dBm. There is no dc voltage across the page output terminals.
- The page output uses the tip and ring terminals of the jack. The sleeve terminal of the jack connects to ground. You must use a stereo plug to connect the page signal output.

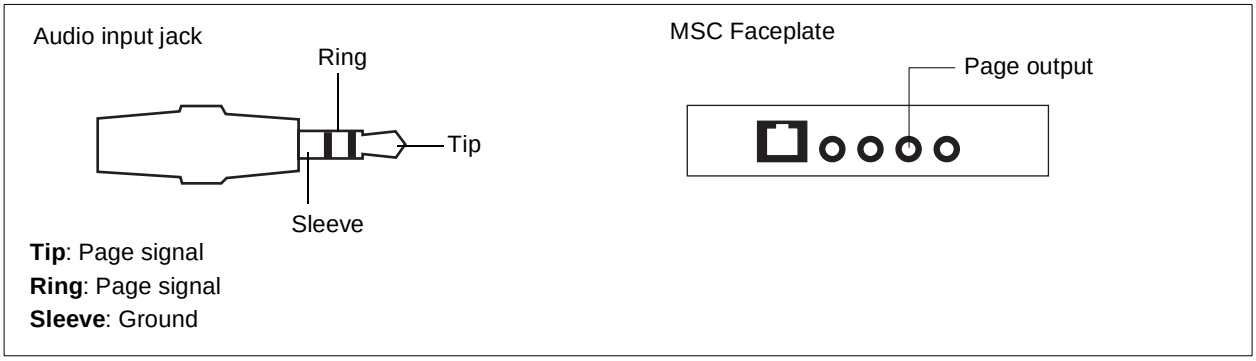
When you use the page signal output jack to connect an external paging amplifier, you also use the page relay jack which contains a floating relay contact pair. The system uses this jack to control the external paging amplifier.

- The contact pair has a switch capacity of 50 mA (non-inductive) at 40 V (maximum). You must remove any inductive load on the output.
- The page relay contacts connect to the tip and ring terminals of the jack. The sleeve terminal of the jack connects to ground. You must use a stereo plug to connect the page relay.

Use this procedure to install the external paging system using the installation instructions that came with the paging system.

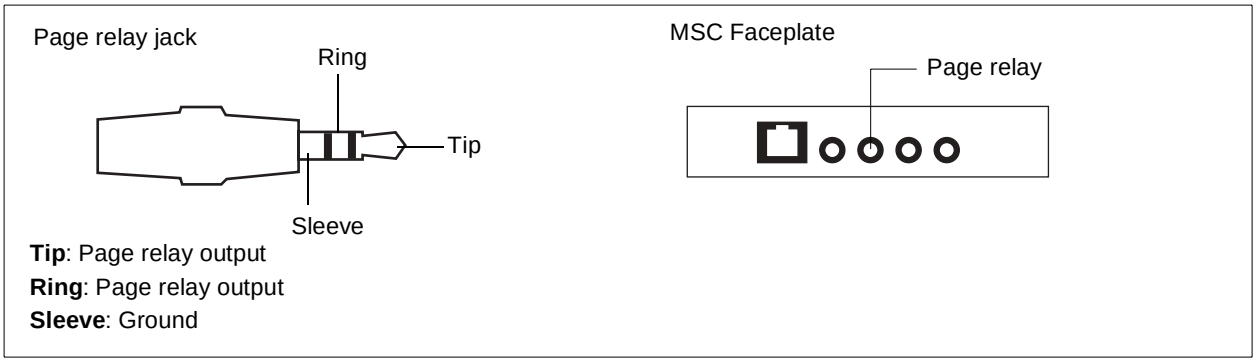
1 Connect the paging system audio input to the Page output on the MSC. Refer to Figure 209.

**Figure 209** Audio input jack




2 Connect the paging system relay to the Page relay output on the MSC. Refer to Figure 210.

**Figure 210** Page relay jack




**Warning:** The paging connections must not be connected to exposed plant.

**Tip: Paging tips**

Business Communications Manager external paging does not support talk back paging equipment unless you use an external line port.

The Business Communications Manager system provides paging over the telephone speakers when there is no external paging equipment.

3 This procedure is complete.

# Connect an external music source

Use this procedure to connect the external music source to the Business Communications Manager jack. You can use any customer-supplied approved low power device as a music source. A music source includes equipment such as a radio with a high impedance earphone jack, as a music source.

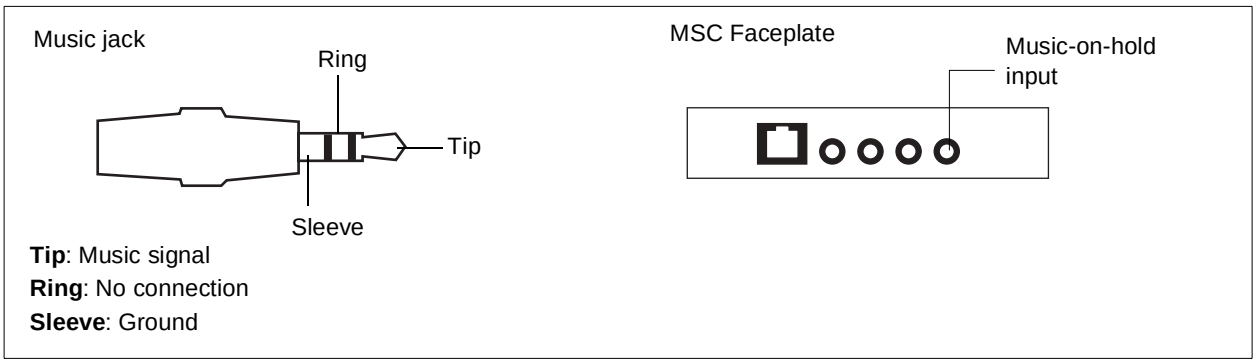
## Music on hold specifications

Ensure that the music source follows these guidelines.

- Nominal input impedance is 3.3 kilohms.
- Nominal sensitivity of this interface returned to digital encoded PCM is -22 dBm0 for a 0.25 V rms input signal.
- The input is limited so that the encoded analog content at the digital interface to the network does not exceed -12 dBm when averaged over any three-second interval.
- The maximum non-clipped input level is 1 V rms.
- The interface is protected against ringing cross.

**1** Connect the miniature jack of the music source output to the music-on-hold input on the MSC. Refer to Figure 211.

**Figure 211** Music on hold jack




**2** Adjust the volume of the music source to a good level by activating Background Music and adjusting the volume at the music source.

**TIP:** You can adjust the Background Music volume at every telephone.

**3** Enable Music for callers on Hold and for Background Music through programming. Refer to the *Business Communications Manager 2.5, Programming Operations Guide* for more details.

**4** This procedure is complete.

# Chapter 15
# System Monitoring and Troubleshooting

This chapter describes monitoring and troubleshooting options to determine the operational status or cause of malfunctions in the Business Communications Manager hardware.

This section describes the following main topics:


- "System Status Display LEDs" on page 370
- "Monitor System Status Through the Unified Manager" on page 373
- "Monitor the RAID LEDs" on page 375
- "Monitor Media Bay Module LEDs" on page 377
- "RAID Disk Mirroring" on page 378
- "Monitor or Configure Disk Mirror Settings Through the Unified Manager" on page 379
- "Monitor or Configure Disk Mirror Settings Through PuTTy or Telnet" on page 384
- "Business Communications Manager does not Function" on page 395
- "Emergency Telephone Does Not Function" on page 395
- "ATA 2 Does Not Function" on page 395

**Danger: Electrical shock warning**.

Disconnect the power cord, telephone cables and network cables before opening the platform base chassis. Read and follow installation instructions carefully.

**Warning:** Protect the hardware components against damage from electrostatic discharge. Always wear a ground wrist strap before you handle components. Always place the components in static-free container.

Use the Unified Manager, or remote access interfaces in conjunction with the faceplate LEDs to determine the operational state of the system hardware components.

Hardware problems appear as any of the following:

- The LEDs on the Business Communications Manager base function tray, advanced function tray (RAID upgrade) or the media bay modules do not display normal operational status.
- Business Communications Manager system does not function at all.
- The emergency telephone does not function.
- ATA 2 does not function.

# System Status Display LEDs

The LEDs on the Business Communications Manager base function tray are part of the System Status Display (SSD) board. Figure 212 shows an interior view of the base function tray and the SSD board location.

**Figure 212** SSD board connections

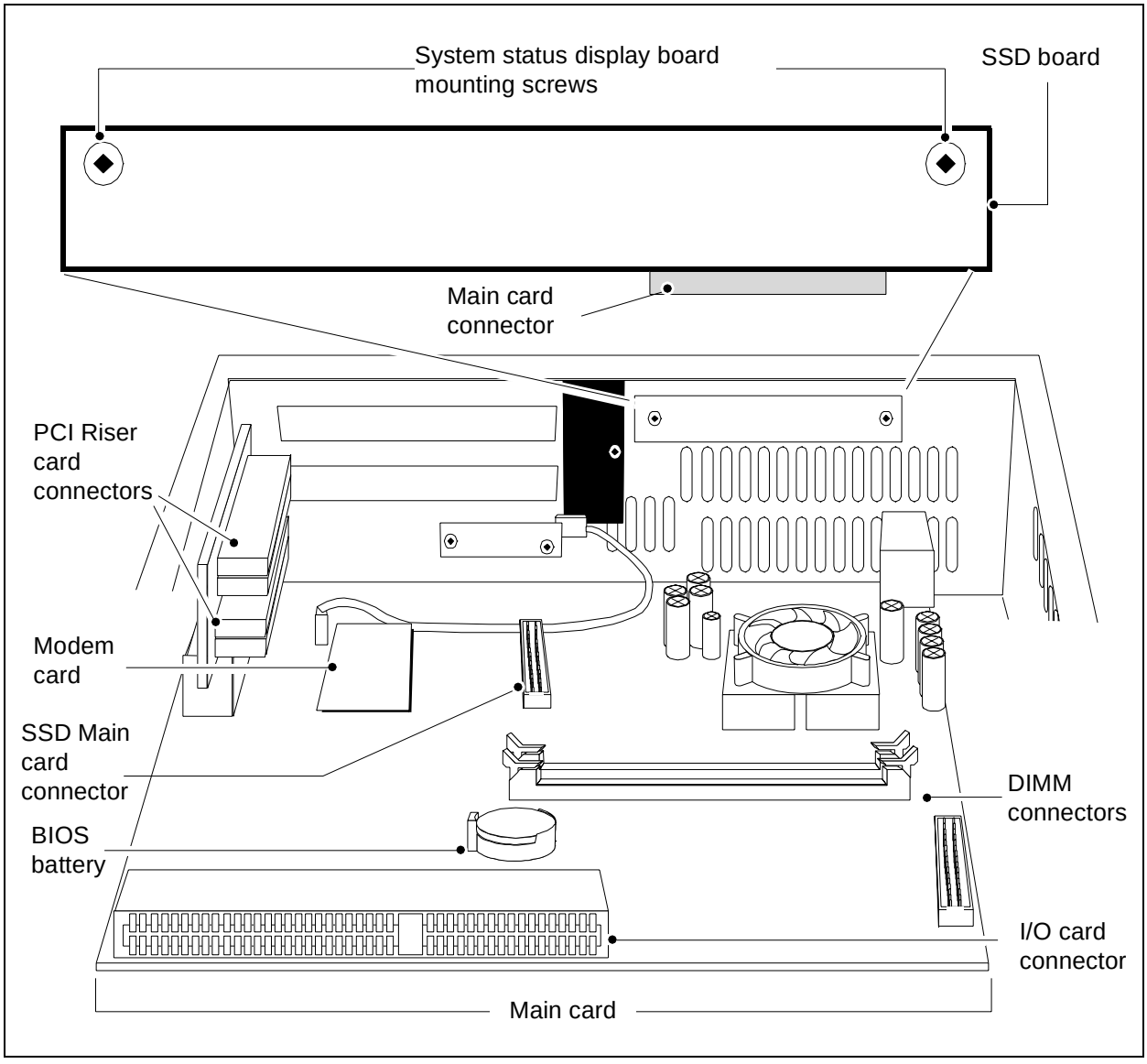
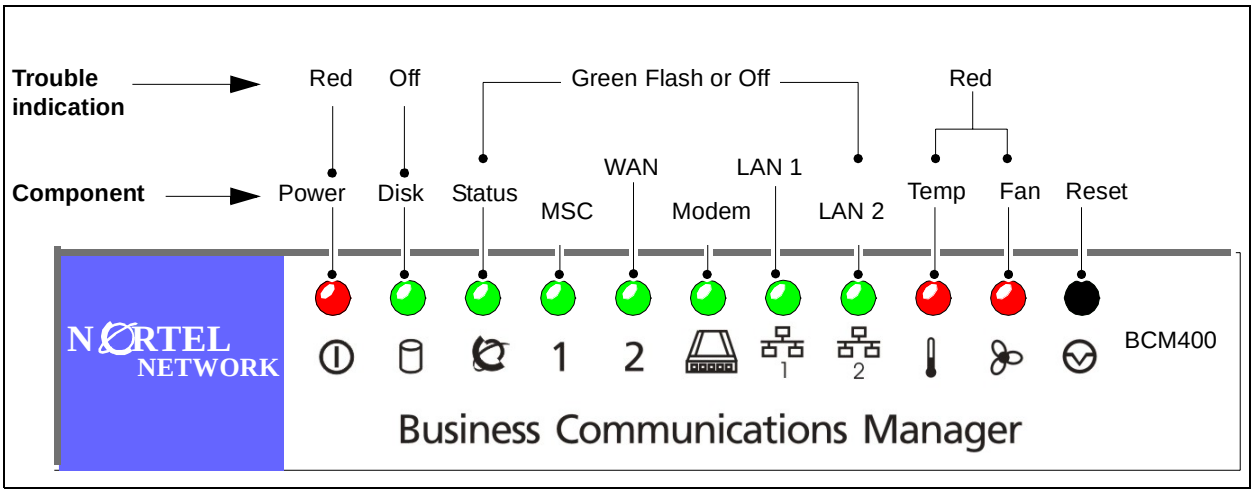



Figure 213 shows what the LEDs look like on the outside of the base function tray. The labels in the illustration indicate the hardware that each LED supports.

**Figure 213** LED locations on the face of the base function tray




**Note:** The system status LEDs correspond to the devices, not to the PCI slots.

**Note:** LEDs 3 - 8 (inclusive) do not blink if there is a failure in the monitoring software.

Table 61 summarizes the possible operating states of the LEDs on the front of the Business Communications Manager base function tray. The Business Communications Manager expansion unit has both a power and a status LED, which provide the same indicators as for the base function tray.

**Table 61** Business Communications Manager LED states

| LED Label | Description | Green LED On | Green LED Flash | Red LED On (Only) | Green LED Off |
|---|---|---|---|---|---|
| | Indicates state of all powered components. | OK | N/A | voltage irregularity or component failure | N/A |
| | Indicates access to the system disk drive | indicates disk drive activity | N/A | N/A | N/A |
| | Indicates condition of system status | all monitored services are functioning | Failure in one or more telephony service | N/A | not all services are working |
| 1 | PCI Device/ MSC | Device is present and the driver is active | driver is not running | N/A | Device is defective or not present. |

**Table 61** Business Communications Manager LED states (Continued)

| LED Label | Description | Green LED On | Green LED Flash | Red LED On (Only) | Green LED Off |
|---|---|---|---|---|---|
| 2 | PCI Device/ WAN1 + WAN2 | Device is present and the driver is active | driver is not running | N/A | Device is defective or not present. |
| | PCI Device/ Modem | Device is present and the driver is active | driver is not running | N/A | Device is defective or not present. |
| | PCI Device/ LAN 1 | Device is present and the driver is active | driver is not running | N/A | Device is defective or not present. |
| | PCI Device/ LAN 2 | Device is present and the driver is active | driver is not running | N/A | Device is defective or not present. |
|  | Chassis/CPU Temperature | Temperature is normal. | N/A | Sensor is non-operational or Temperature is out of range. | N/A |
| | Fans | All installed fans are working | N/A | Fan failure. | N/A |

## Power status (LED 1)

Indicates the status of all power components. Green indicates normal status. Red indicates an excessive voltage deficiency or a component failure (such as a redundant power supply fan or module). An LED that monitors a component will also show a fault in combination with the Power LED.

## Hard disk activity (LED 2)

Green indicates hard disk access. No LED activity indicates the system cannot access the hard disk. If there is a hard disk failure in a standard configuration, a system shutdown is either in progress, imminent or complete.

## System status (LED 3)

A green blinking LED indicates one or more telephony services are not operational. Six non-blinking LEDs in the center, indicate monitoring software is not active.

## PCI devices (LEDs 4-8)

LEDs 4-8 monitor the peripheral components (2 x NICs, 1 x WAN, 1 x Modem, 1 x MSC). A steady green LED indicates the device is detected and operationally normal. A flashing green LED indicates that software detects the hardware, but there is no device driver. No colour indicates the device is defective or missing.

- LED 4: Monitors the MSC
- LED 5: Monitors the WAN (if installed)
- LED 6: Monitors the modem (if installed)
- LED 7: Monitors the NIC 1 (LAN1)
- LED 8: Monitors the NIC 2 (LAN2)

## Chassis/CPU temperature (LED 9)

Green indicates a normal, operational temperature range for the chassis. There are three LEDs on the front of the Business Communications Manager base function tray and one on the front of the expansion unit used to assess fan function. Table 62 describes the possible states of the fan and temperature LEDs.

**Table 62** Fan and temperature LEDs on the base function tray

| LED Label | Description | Green LED On | Red LED On (Only) |
|---|---|---|---|
| | Temperature | Temperature is below threshold. | Temperature is in alarm status.<br>Possible fan(s) failure. |
| | Fans | All installed fans are working | Sensor failure or there is a problem with a minimum of one fan. |
| | Power | All components are working | Component failure |

# Monitor System Status Through the Unified Manager

The Business Communications Manager System Status Monitor allows you to view the status of the system LEDs on your PC. This status display allows you to make preliminary decisions regarding the type of intervention required without necessarily having to inspect the Business Communications Manager hardware.

Use this procedure to access the System Status Monitor through the Unified Manager:

1. Open the Unified Manager.
2. Under **Diagnostics**, click on **System Status Monitor**.

   The LED Display screen appears.
3. To set the parameters for the System Status Sanity check, click the LED Settings tab.

   The LED Settings record appears.

**Figure 214** System Status Monitor LED Settings record

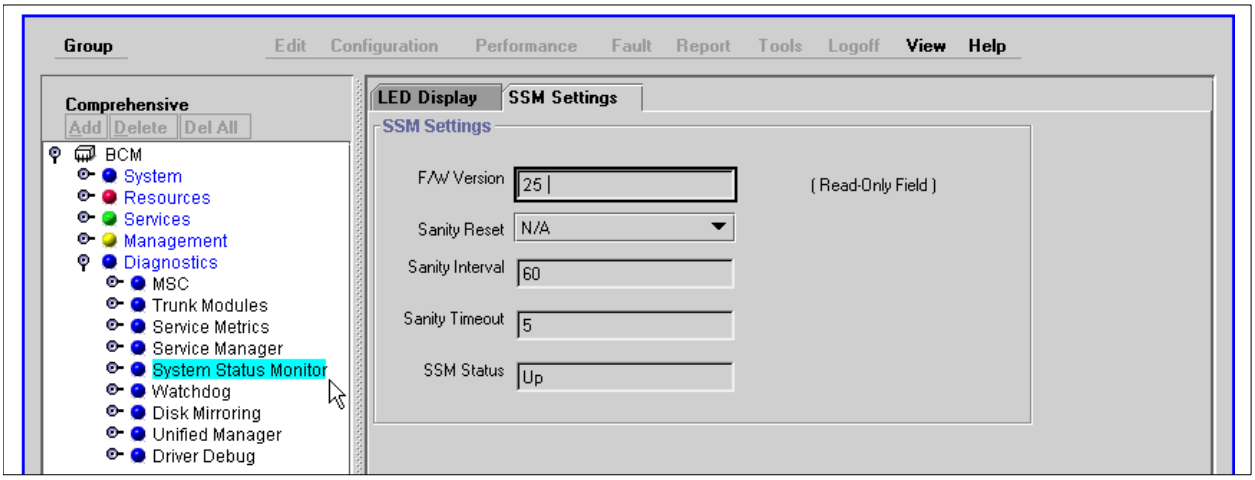



Table 63 lists the values on the LED Settings screen.

**Table 63** LED Display screen settings

| Attribute | Values | Description |
|---|---|---|
| Version | Read only | The current version LED board firmware. |
| Reset | Yes, No, N/A | Use Yes to allow the system status monitor board to reset the computing platform in the event that the sanity check fails the user set parameters. |
| Sanity Time | 60-255<br>Default: 240 | The time in seconds between sanity checks. |
| Timeouts | 0-254<br>Default: 10 | The number of sanity checks that must fail before the system status monitor sends a reset signal to the computing platform. |

4 This procedure is complete.

## Monitor standard configuration hard disk status through the Unified Manager

Use the procedure described in this section to monitor the operational status of systems equipped with the standard hard disk configuration. The standard configuration uses a single hard disk.

The procedures describe monitoring and diagnosis techniques for the standard hard disk configuration.

**Note:** If you are using the Unified Manager system status monitor function, ensure hard disk monitoring configuration settings are set correctly.

Use the system status monitor from the Unified Manager to determine the operational status of the hard disk. Alternatively, examine the LED display panel on the front of the base function tray (see “Hard disk activity (LED 2)” on page 372).

**Note:** If the hard disk fails completely in a standard configuration, the system either fails to respond or performs a software shutdown. Replace the hard disk and perform a backup using the backup and restore utility (BRU) - see “Use the Backup and Restore Utility” on page 215.

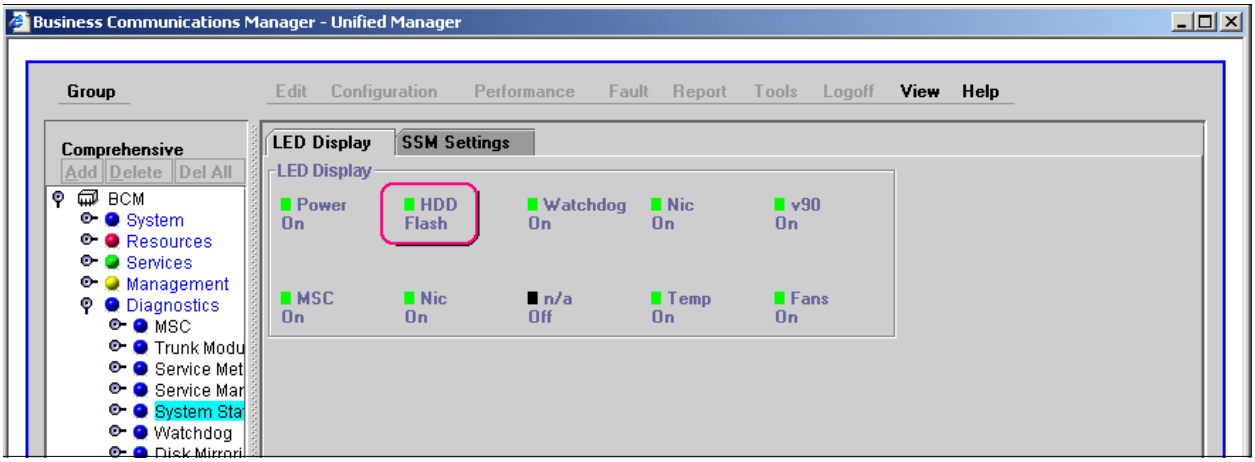
The system status monitor indicator shows hard disk access activity. A flashing green indicator signifies normal disk access activity.

1 Access the Unified Manager.

2 Under **Diagnostics**, click on **System Status Monitor**.

The System Status Monitor LED display screen appears (see Figure 215).

**Figure 215** System Status Monitor LED display screen




3 Verify that the indicator shows normal access to the hard disk (flashing green light).

If the hard disk fails in a single hard disk configuration, a system shutdown is either imminent, in progress or complete. Replace the hard disk (see “Remove a Hard Disk Cage” on page 221).

4 This procedure is complete.

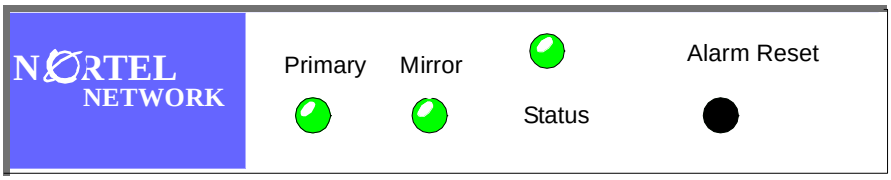
# Monitor the RAID LEDs

Use this procedure to determine the current operational state of the RAID hard disks and disk mirroring operation (see Figure 216). The RAID status LEDs are visible only for systems equipped with the RAID configuration. Three LEDs are located on the bezel face of the BCM400 advanced function tray or on the hard disk access panel at the rear of the BCM200 platform base chassis.

The RAID LEDs indicate monitoring of the following:

- Primary master hard disk activity
- Mirror hard disk activity
- RAID disk mirroring status activity

**Figure 216** Advanced function tray RAID status LEDs




## Determine RAID status

**1** Examine the Primary/Mirror LEDs on the BCM400 advanced function tray faceplate. Alternatively, examine the hard disk cover access panel on the rear of the BCM200. Use the table shown in this step to interpret the operational state of the RAID Primary master / Mirror master hard disks and perform any associated maintenance action if required.

| **Primary/Mirror LED colour** | **Description** | **Maintenance action** |
|---|---|---|
| Solid Green | Drive installed and initialized on the current channel | Normal operation - no maintenance required |
| Flashing Orange | Indicates disk activity | Normal disk mirror function - no maintenance required |
| Orange | Channel activity (read/write) | Normal operation during disk mirror function - no maintenance required |
| Solid Red | Drive not installed or failed | Immediate action required:<br>• Check the RAID operational status).<br>• Check hard disk power and data connections<br>• Replace the hard disk if required |

2 Examine the mirror mode status LED on the BCM400 advanced function tray faceplate. Alternatively, examine the hard disk cover access panel on the rear of the BCM200. Use the table shown in this step to interpret the operational state of the disk mirror function. Perform any associated maintenance action if required.

| Status LED description | Description | Maintenance action |
|---|---|---|
| Solid Green | Drives are in mirror mode. Data is identical | Normal operation - no maintenance required |
| Orange | Copy/compare in progress | Normal operation - no maintenance required |
| Flashing Green | Drives may not be identical | Indicates a data comparison fault. For 3.5x version software (and higher), the system automatically adapts for data mismatches and unequal hard disk capacity. The system attempts a disk mirror rebuild.<br>The system continues to operate. Nortel Networks recommends you perform the following:<br>• Examine the status report to determine which hard disk has the smaller capacity.<br>• Replace the smaller hard disk (primary master or mirror master) with a new hard disk of the correct size. Equipment provided by Nortel Networks assures correct hard disk capacity requirements |
| Solid Red | • Drives are not in mirror mode<br>• Missing or bad hard disk (1 or both)<br>• Occurs on newly installed RAID card or hard disk (first 10 min). SSM begins mirror process - no action required.<br>• SSM determined BCM is not initialized (core software, WAN, MSC). | Immediate action required:<br>• Check the RAID operational status.<br>• Check hard disk power and data connections<br>• Replace the hard disk if required<br>• Initialize the BCM |

# Monitor Media Bay Module LEDs

The Business Communications Manager media bay modules are working when both the Power and Status LEDs on the modules are on, and are not blinking.

- If the Power LED does not light, refer to "Shut down the system" on page 151. After the Business Communications Manager is correctly shut down, remove the module and check the connectors at the back of the module for dust or loose connections.

  After you reinstall the module, if the LED still does not light, install a different module into that bay to check for a possible fault in the backplane. If the second module works, assume that the first module is defective and replace it with a new module.

- If the Power LED lights, but the Status light does not light, or continues to blink, wait 10 minutes to allow for information download. If the light continues to blink, power down the system and check the dip switch settings on the module. Ensure the connector is clean and free from debris.
- If the LEDs are on solid, but the module cannot communicate or be communicated with, check the Unified Manager settings for the module and the dip switch settings on the back of the module.

For information about the LEDs on the Business Communications Manager, refer to See Table 61 on page 371.

## RAID Disk Mirroring

The RAID configuration (RAID 1) uses two hard disks. One disk is called the primary master hard disk, the other is called the mirror master hard disk. Disk mirroring is the process of ensuring the data from one hard disk is identical to the other.

Disk mirroring provides data redundancy and fault tolerance should one disk fail. The mirror hard disk continues to function and the system operates without any loss of service if the primary master hard disk fails. Similarly, the primary master hard disk continues to function and the system operates without any loss of service if the mirror hard disk fails.

Over time, configuration or load data on your system changes. The system writes the new data to the both disks simultaneously.

**Note:** Under some conditions, the system will halt operating if a hard disk fails during a read/write to the operating system (O/S) portion of the hard disk. To continue operation, reboot the system.

The RAID configuration disk replacement scenarios are as follows:

- If you replace a RAID hard disk on site, the Business Communications Manager system status monitor service automatically detects the presence of a RAID device. The system copies the data from the programmed disk to the blank replacement disk. In this case, the programmed hard disk is the mirror master (active for read).
- If you replace a RAID primary master disk on site, the mirror master disk acts as the primary data source (mirror master). The system status monitor service identifies the new blank primary master disk and instructs the RAID to copy the data from the mirror master disk to the primary master disk. In this case, the mirror master hard disk is the mirror master.

Use one of the following two methods to access the disk mirror functions:

- “Monitor or Configure Disk Mirror Settings Through the Unified Manager” on page 379
- “Monitor or Configure Disk Mirror Settings Through PuTTy or Telnet” on page 384

The disk mirror function allows you to:

- monitor RAID card operational status
- monitor disk operational status
- monitor disk mirror status
- change a standard hard disk configuration to a RAID configuration
- replace a primary master or mirror master hard disk in an existing RAID configuration

# Monitor or Configure Disk Mirror Settings Through the Unified Manager

Use the procedures in this section to ensure all disk mirroring configuration settings are correct. Use the Unified Manager to change the disk mirror settings to the default values if required. The procedures described in this section are valid only for those systems equipped with a RAID configuration.

## Access disk mirroring through the Unified Manager

Use this procedure to review the primary master and mirror master hard disk settings on systems equipped with a RAID configuration. Use the Unified Manager in this procedure to monitor the RAID disk mirror operation.

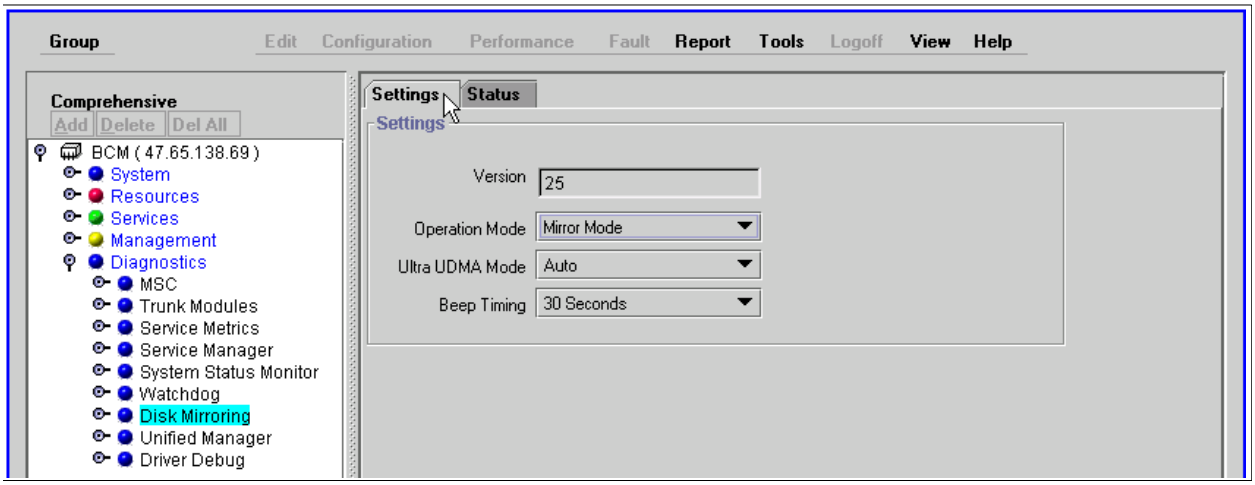
**Note:** You must ensure the system status monitor service is running to monitor primary master / mirror master disk operation and disk mirroring activity.

1. Access the Unified Manager after system boot-up is complete.
2. Under **Diagnostics**, click on **Disk Mirroring**.

   The disk mirror settings screen display appears (see Figure 217).
3. Select the **Settings** tab.
4. Ensure the following fields display the default values as shown:
   - **a** Operation mode = Mirror mode
   - **b** Ulta UDMA mode = Auto
   - **c** Beep timing = 30 (seconds) audible alarm (you can configure the interval between beeps).

**Note:** On some systems, if the RAID card fails, the audible alarm sounds continuously for 15 seconds. After the 15 second period, the beep alarm sounds in accordance to the beep timing setting.

**Figure 217** Disk mirror settings screen




| Settings field description | Perform the activity |
|---|---|
| **Operation Mode**: Options available are Primary Master, Mirror Master, Mirror Mode (default value). | Nortel Networks recommends you select **Mirror mode** from the drop down menu<br>You can disable the mirroring function and operate from either the primary master or the mirror master drive only. Use this option to isolate drive problems. |
| **Ultra UDMA Mode**: Options available are disable, 0-16, 1-24, 2-33, 3-48, 4-66, Auto (default value). | Nortel Networks recommends you select **Auto** mode from the drop down menu.<br>You can change the interface speed to the HDD. Selecting other values can effect performance. |
| **Beep Timing**: Options available are disable, continuous, 5, 10, 15, 20, 30 (default value - seconds), 1min, 2min. | Select the Beep timing interval for alarm notification.<br>On some systems, if the RAID card fails, the audible alarm sounds continuously for 15 seconds. After the 15 second period, the beep alarm sounds in accordance to the beep timing setting. |

5 Power recycle the Business Communications Manager for any changes to take effect.

6 This procedure is complete.

## Monitor RAID disk mirror operational status through the Unified Manager

Use this procedure to monitor the primary master and mirror master hard disk activity on systems equipped with a RAID configuration. Use the Unified Manager in this procedure to monitor the RAID disk mirror operation. For information

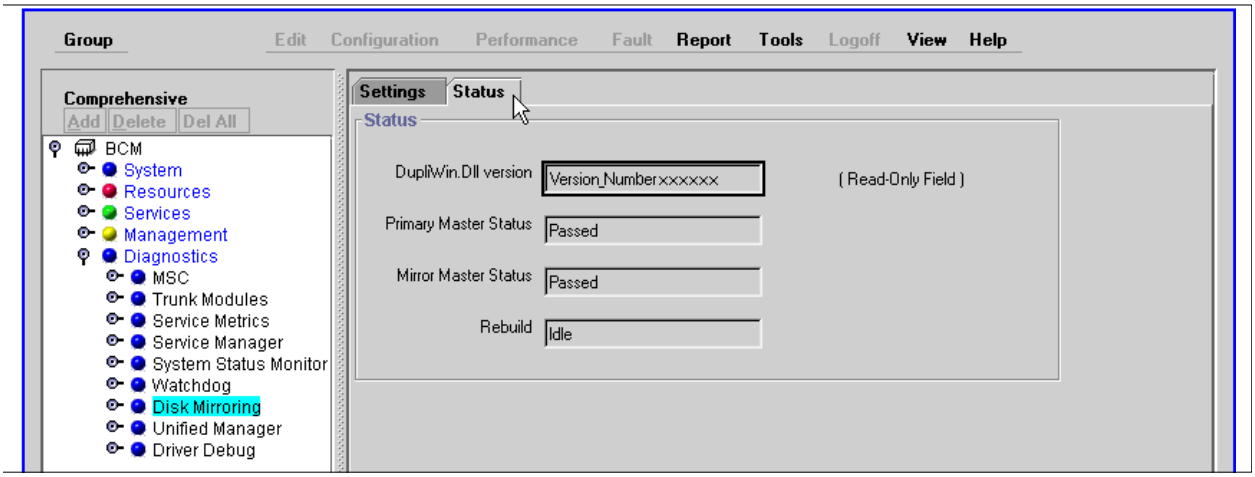
**Note:** You must ensure the system status monitor service is running to monitor primary master / mirror master disk operation and disk mirroring activity.

1. Access the Unified Manager.
2. Under **Diagnostics**, click on **Disk Mirroring**.

   The Disk mirror screen display appears.
3. Click on the **Status** tab

   The disk mirror screen displays the operational status of primary master and mirror master disks (see Figure 218).

**Figure 218** Disk mirroring status display screen



4 Confirm that the status for the disk mirroring activity is correct (see status field descriptions in the table below). To produce a status report, refer to "Access the RAID status report through the Unified Manager".

| Status field | Description |
|---|---|
| DupliWin.dll version | Read only field displays the RAID software version. The latest load always has the latest RAID software. |
| Primary master status | Read only field displays the status of the primary master disk (Passed / Failed / NA).<br>• If the field indicates Passed, the drive is operating normally<br>• If the field indicates Failed, check the power and IDE ribbon cable connections or replace the faulty hard disk<br>• If the field indicates N/A (not available) check the hard disk power and IDE ribbon cable connections |
| Mirror master status | Read only field displays the status of the mirror master disk (Passed / Failed / NA)<br>• If the field indicates Passed, the drive is operating normally<br>• If the field indicates Failed, check the power and IDE ribbon cable connections or replace the failed hard disk<br>• If the field indicates N/A (not available) check the hard disk power and IDE ribbon cable connections |
| Rebuild | Read only field displays the mirror data rebuild progress (idle / started) |

5 This procedure is complete.

## Access the RAID status report through the Unified Manager

Use the procedure in this section to display a status report that summarizes primary master and mirror master hard disk installation and operational information. The status report is valid only for systems equipped with a RAID configuration.

**Note:** You must ensure the system status monitor service is enabled to monitor primary master / mirror master disk operation and disk mirroring activity.

1 Access the Unified Manager.

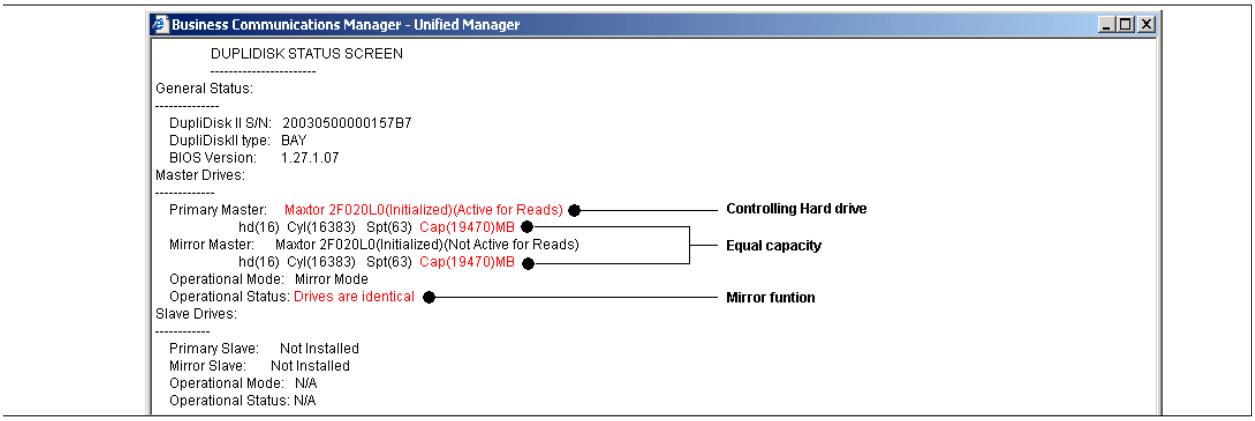
2 Under **Diagnostics**, click on **Disk Mirroring**.

The Disk mirror screen display appears.

3 Select **Reports** from the top line menu. Click on **View Status**.

The system displays the hard disk operational status information (see Figure 219).

**Figure 219** View status report screen




**4** Confirm that the primary master and mirror master hard disks are functional.

| If | Perform the activity |
|---|---|
| The hard disks are not identical. | Use Nortel Networks equipment to ensure the hard disks meet minimum requirements. |
| The software has detected unequal hard disk storage capacity. | For 3.5x version software (and higher), the system automatically adapts for unequal hard disk capacity. The system continues to operate. Nortel Networks recommends you perform the following:<br>• Examine the status report to determine which hard disk has the smaller capacity.<br>• Replace the smaller hard disk (primary master or mirror master) with a new hard disk of equal size (or larger) |
| If the RAID is not in mirror mode | Change the disk mirroring function to mirror mode |
| If any hard disk is not operational | Exchange the malfunctioning hard disk with a new hard disk |

**5** This procedure is complete.

## Monitor disk mirroring using Unified Manager

Use this procedure to verify and monitor the disk mirroring process. Disk mirroring is the process of duplicating the data from one hard disk to the other. After RAID installation and system boot-up, the system automatically detects the presence of a RAID configuration and begins the disk initialization and mirroring process. This procedure is valid only for those systems equipped with a RAID configuration.

Monitor disk mirroring progress in tandem with the RAID LED status indicators.

**Note:** The mirroring process can take up to 3+ hours to complete. The Business Communications Manager system continues to operate normally during the disk mirroring process. However, because disk mirroring occupies computing resources, Nortel Networks recommends you perform disk mirroring during a period of low call traffic.

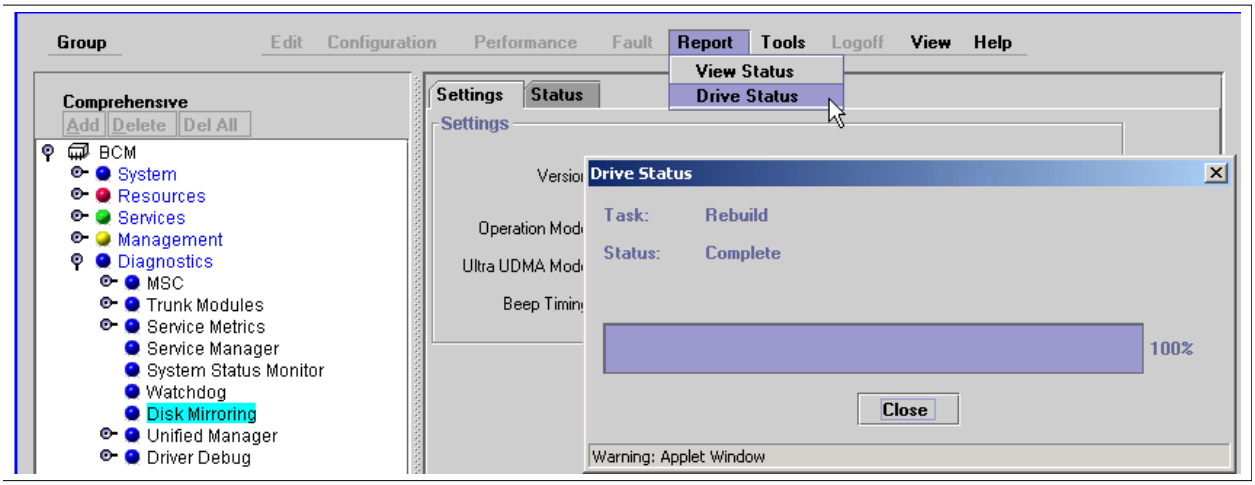
Nortel Networks recommends you perform any system reboot only as required and at the beginning of the disk mirroring process.

1. Access the Unified Manager after system boot-up is complete.
2. Under **Diagnostics**, click on **Disk Mirroring**.

   The Disk mirror settings screen display appears (see Figure 217).
3. Select **Reports** and click on **Drive Status** (see Figure 220).

   The progress indicator shows the current state of the mirroring process.

**Figure 220** Drive status report screen




4. This procedure is complete.

# Monitor or Configure Disk Mirror Settings Through PuTTy or Telnet

Use the procedures in this section to ensure all disk mirroring configuration settings are correct. Use the PuTTy application or Telnet through a remote link to change the disk mirror settings to the default values if required. The procedures described in this section are valid only for those systems equipped with a RAID configuration.

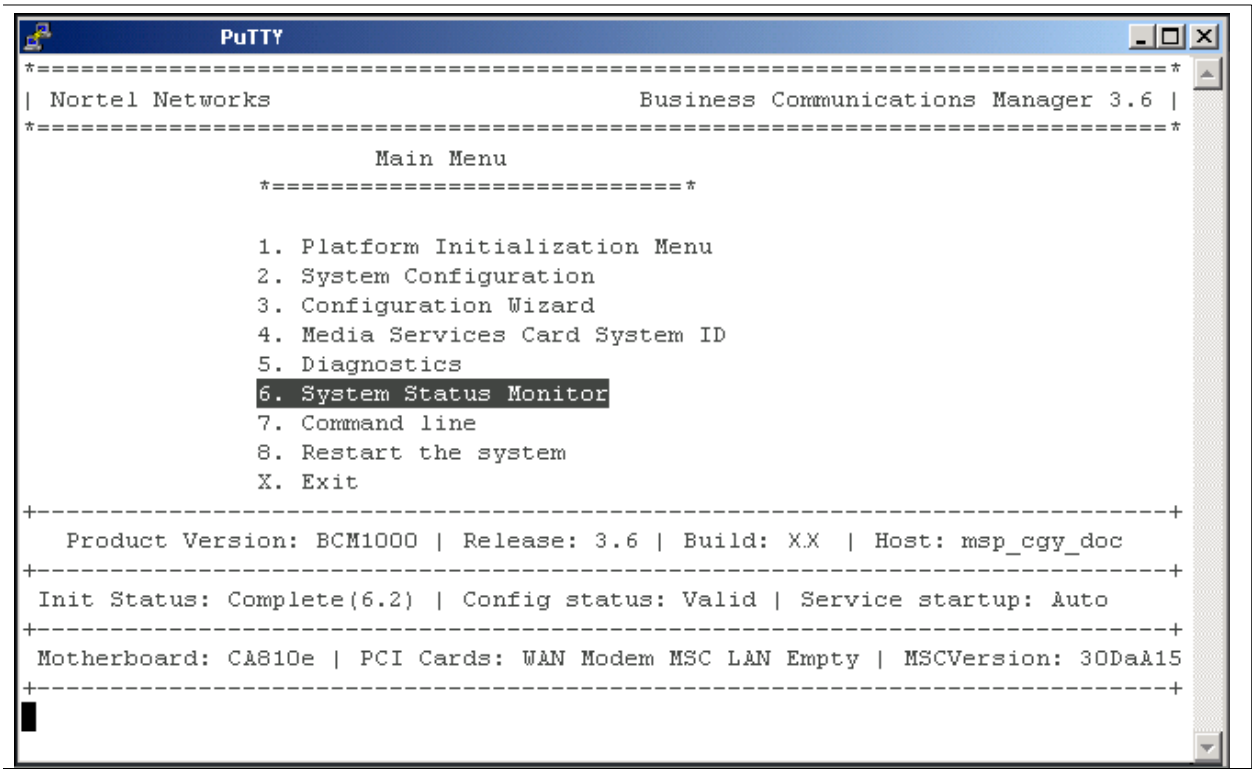
## Access disk mirroring through PuTTy or Telnet

Use the procedure in this section to access the System Status Monitor and Mirror disk menus through either the PuTTy application or Telnet.

Use this procedure to access the System status monitor and disk mirror menus.

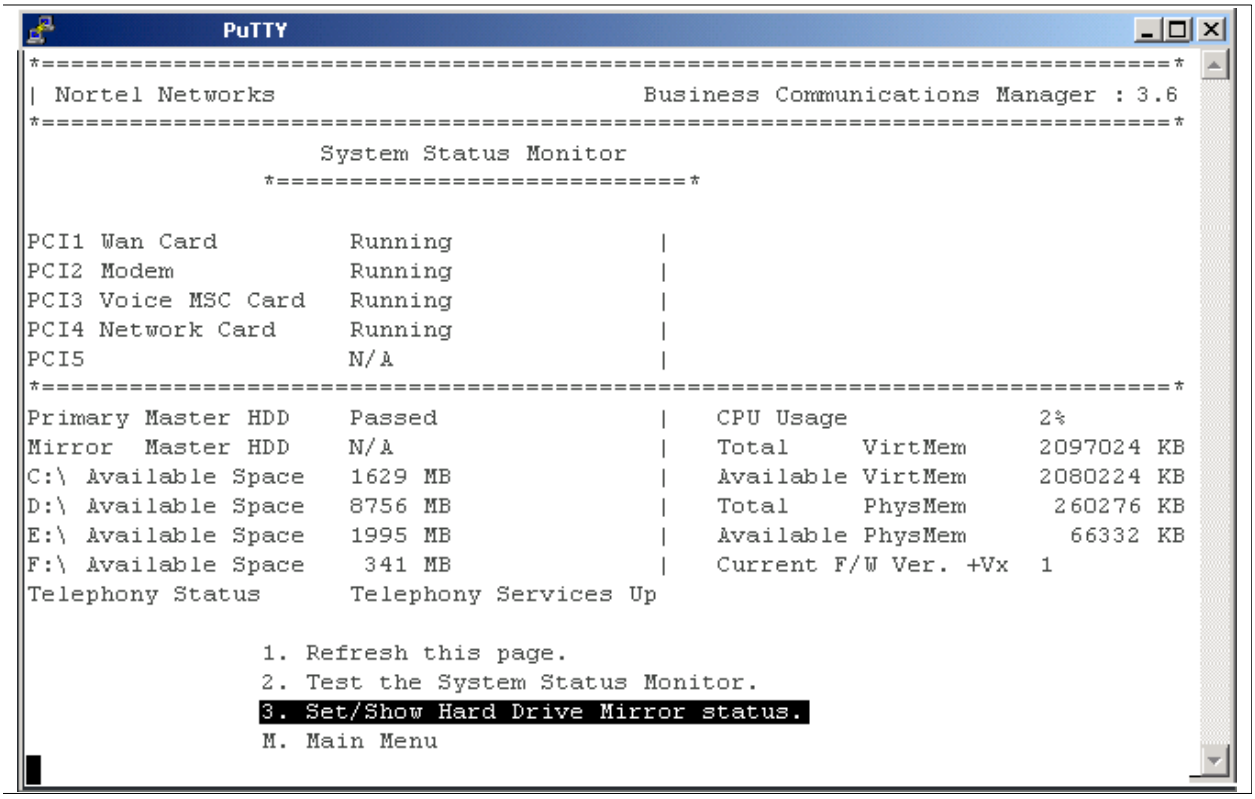
1. Click the shortcut PuTTY icon.
   The PuTTY Configuration screen appears.
2. Click on the radio box beside SSH.
3. In the Host Name (or IP address) box enter the IP address or the Fully Qualified Domain Name for the Business Communications Manager you want to connect with.
4. Click Open.
5. The first time you enter the application you may receive a security notice. Click OK.
   The PuTTY text screen appears.
6. At the login prompt, enter an administrator-level user name.
7. Press <Enter>.
8. At the next prompt, enter the corresponding password.
9. Press <Enter>.
10. The Business Communications Manager main menu screen appears (see Figure 221 on page 386).

**Figure 221** Main Menu screen


PuTTY
| Nortel Networks Business Communications Manager 3.6 |
Main Menu
1. Platform Initialization Menu
2. System Configuration
3. Configuration Wizard
4. Media Services Card System ID
5. Diagnostics
6. System Status Monitor
7. Command line
8. Restart the system
X. Exit
Product Version: BCM1000 | Release: 3.6 | Build: X.X | Host: msp_cgy_doc
Init Status: Complete(6.2) | Config status: Valid | Service startup: Auto
Motherboard: CA810e | PCI Cards: WAN Modem MSC LAN Empty | MSCVersion: 30DaA15

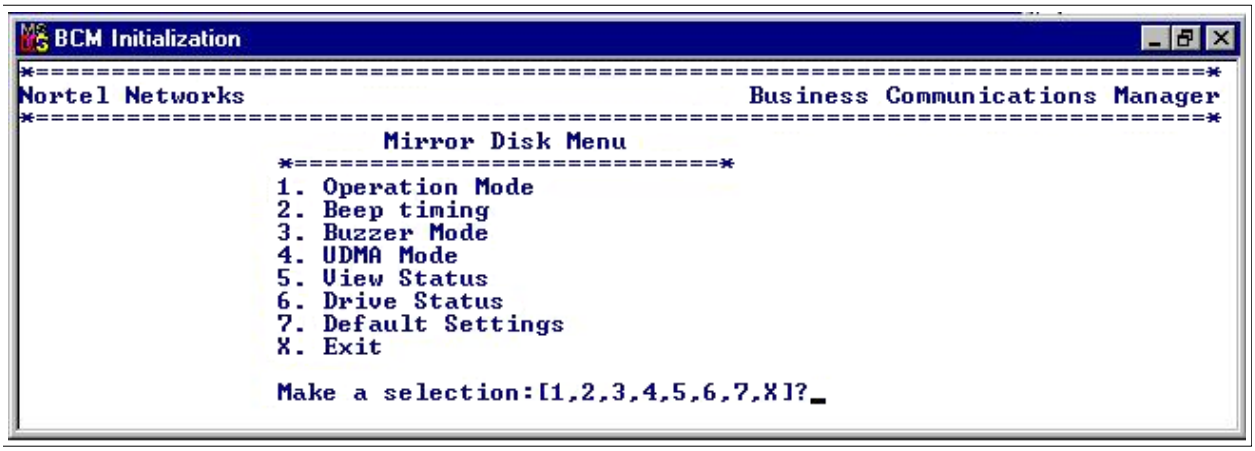
**11** Select option 6: System Status Monitor from the main menu screen.
The system status monitor screen appears (see Figure 222 on page 387).

**Figure 222** System status monitor screen


PuTTY
| Nortel Networks Business Communications Manager : 3.6
System Status Monitor
PCI1 Wan Card Running
PCI2 Modem Running
PCI3 Voice MSC Card Running
PCI4 Network Card Running
PCI5 N/A
Primary Master HDD Passed
Mirror Master HDD N/A
C:\ Available Space 1629 MB
D:\ Available Space 8756 MB
E:\ Available Space 1995 MB
F:\ Available Space 341 MB
Telephony Status Telephony Services Up
CPU Usage 2%
Total VirtMem 2097024 KB
Available VirtMem 2080224 KB
Total PhysMem 260276 KB
Available PhysMem 66332 KB
Current F/W Ver. +Vx 1
1. Refresh this page.
2. Test the System Status Monitor.
3. Set/Show Hard Drive Mirror status.
M. Main Menu

**12** Select option 3: Set/Show hard drive mirror status from the System status monitor screen. The system displays the Mirror disk menu screen (see Figure 223 on page 387).

**Figure 223** Mirror disk menu screen




**13** This procedure is complete.

## Review or change disk mirror operation mode through PuTTY or Telnet

Use this procedure to review or alter the disk mirror operation mode settings on systems equipped with a RAID configuration. Use the PuTTy application or Telnet through a remote link to change the disk mirror settings to the default values if required..

**Note:** You must ensure the system status monitor service is running to monitor primary master / mirror master disk operation and disk mirroring activity.

1. Access the Mirror disk menu screen as described in "Access disk mirroring through PuTTy or Telnet" on page 385.
2. Select option 1: Operation mode from the Mirror disk menu screen.
   The system displays the Mirror operation menu screen (see Figure 224 on page 388). The Mirror operation menu screen allows you to display or set the startup disk mirror mode.
   - To display the current disk mirror settings, select Option 1: Show operation mode.
   - To change disk mirror settings, select option 2: Set operation mode. Select one of the following disk mirror modes:

     0 - Primary master

     1 - Mirror master

     2 - Mirror mode (default)

**Figure 224** Mirror operation menu screen

3. Power recycle the Business Communications Manager for any changes to take effect.
4. This procedure is complete.

## Change beep timing through PuTTy or Telnet

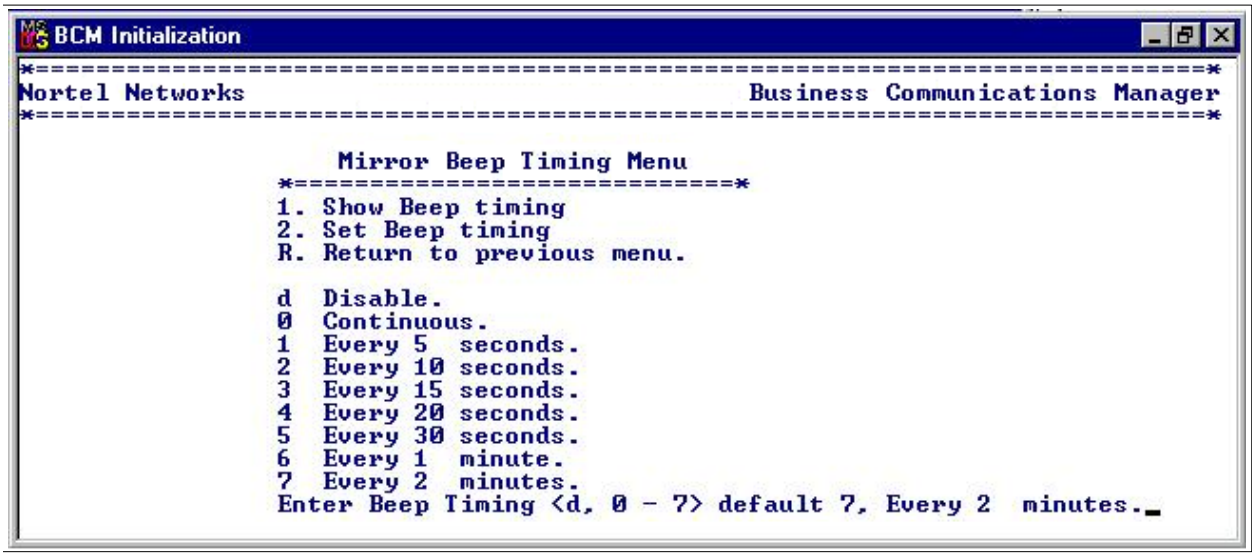
Use this procedure to review or change the interval for the audible alarm on systems equipped with a RAID configuration. Use the PuTTy application or Telnet through a remote link to change the disk mirror settings to the default values if required.

**Note:** You must ensure the system status monitor service is running to monitor primary master / mirror master disk operation and disk mirroring activity.

1. Access the Mirror disk menu screen as described in "Access disk mirroring through PuTTy or Telnet" on page 385.
2. Select option 2: Beep timing from the Mirror disk menu screen. The system displays the Mirror beep timing menu (see Figure 225 on page 389).
3. Select the mirror beep timing interval for the audible alarm.

**Note:** On some systems, if the RAID card fails, the audible alarm sounds continuously for 15 seconds. After the 15 second period, the beep alarm sounds in accordance to the beep timing setting.

**Figure 225** Mirror beep timing menu screen




4. Power recycle the Business Communications Manager for any changes to take effect.
5. This procedure is complete.

## Change buzzer mode through PuTTy or Telnet

Use this procedure to review or change the buzzer mode settings on systems equipped with a RAID configuration. Use the PuTTy application or Telnet through a remote link to change the disk mirror settings to the default values if required..

**Note:** You must ensure the system status monitor service is running to monitor primary master / mirror master disk operation and disk mirroring activity.

1 Access the Mirror disk menu screen as described in “Access disk mirroring through PuTTy or Telnet” on page 385.

2 Select option 3: Buzzer mode from the Mirror disk menu screen.
The system displays the Buzzer mode menu screen (see Figure 226 on page 390). The Buzzer mode menu screen allows you to stop or test the audible alarm. Select one of the following:

- 0 - Stop buzzer (default)
- 1 - Test buzzer
- R - Return to previous menu

**Figure 226** Buzzer mode menu screen

3 This procedure is complete.

## Monitor or change UDMA mode using PuTTY or Telnet

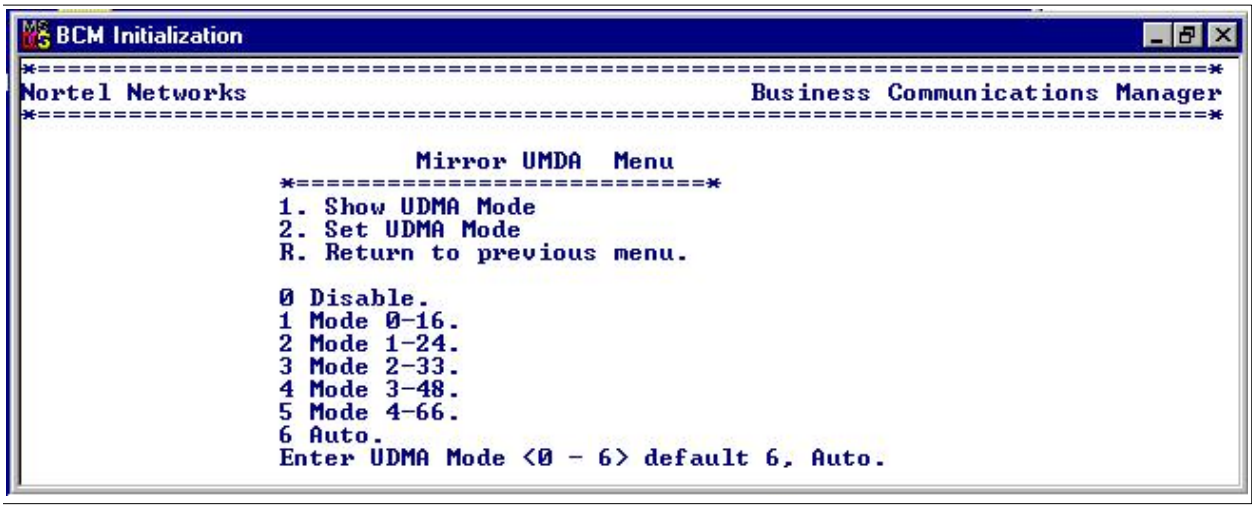
Use this procedure to review or alter the UDMA hard disk settings on systems equipped with a RAID configuration. Use the PuTTy application or Telnet through a remote link to change the disk mirror settings to the default values if required..

**Note:** You must ensure the system status monitor service is running to monitor primary master / mirror master disk operation and disk mirroring activity.

1 Access the Mirror disk menu screen as described in “Access disk mirroring through PuTTy or Telnet” on page 385.

2 Select option 4: UDMA mode from the Mirror disk menu screen.
The system displays the Mirror UDMA menu screen (see Figure 226 on page 390). You can change the interface speed to the hard disks. Nortel Networks recommends you select **Auto** mode from the drop down menu. Selecting other values can effect performance.

**Figure 227** Mirror UDMA menu screen




3 Power recycle the Business Communications Manager for any changes to take effect.

4 This procedure is complete.

## Monitor disk mirroring using PuTTy or Telnet

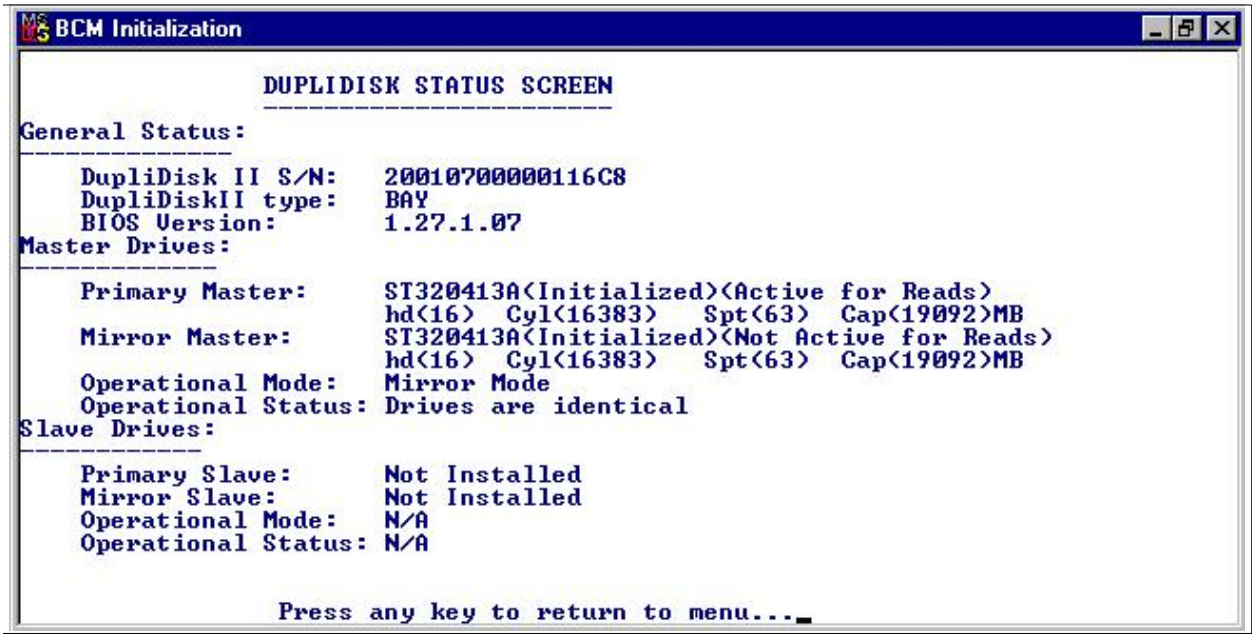
Use this procedure to review the primary master and mirror master hard disk status on systems equipped with a RAID configuration. Use the PuTTy application or Telnet through a remote link to change the disk mirror settings to the default values if required..

**Note:** You must ensure the system status monitor service is running to monitor primary master / mirror master disk operation and disk mirroring activity.

1 Access the Mirror disk menu screen as described in “Access disk mirroring through PuTTy or Telnet” on page 385.

2 Select option 5: View status from the Mirror disk menu screen.
The system displays the RAID Duplidisk status report screen (see Figure 228 on page 392). Confirm that the primary master and mirror master hard disks are functional.

**Figure 228** Duplidisk status screen




| If | Perform the activity |
|---|---|
| The hard disks are not identical. | Use Nortel Networks equipment to ensure the hard disks meet minimum requirements. |
| The software has detected unequal hard disk storage capacity. | For 3.5x version software (and higher), the system automatically adapts for unequal hard disk capacity. The system continues to operate. Nortel Networks recommends you perform the following:<br>• Examine the status report to determine which hard disk has the smaller capacity.<br>• Replace the smaller hard disk (primary master or mirror master) with a new hard disk of equal size (or larger) |
| If the RAID is not in mirror mode | Change the disk mirroring function to mirror mode |
| If any hard disk is not operational | Exchange the malfunctioning hard disk with a new hard disk |

**3** This procedure is complete.

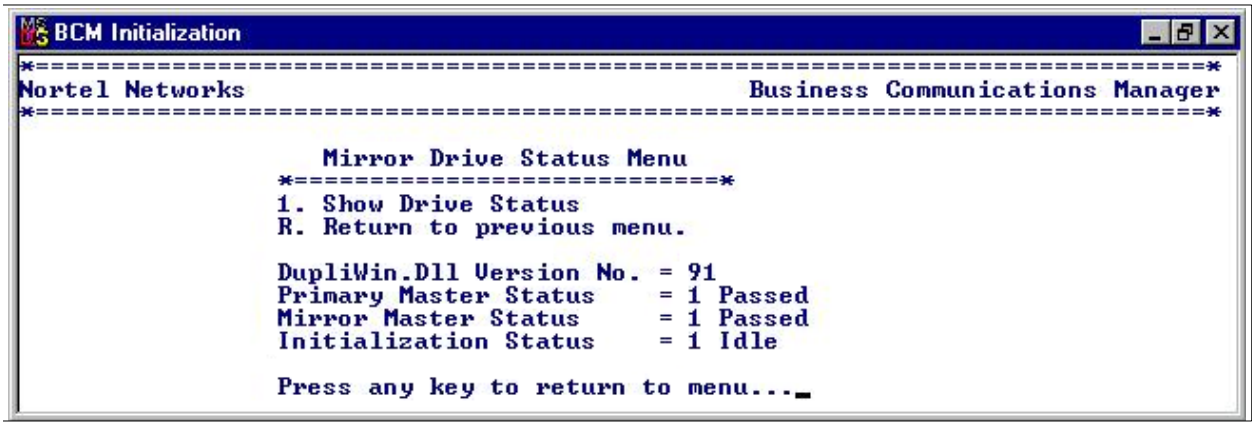
## Review mirror drive status using PuTTy or Telnet

Use this procedure to review the primary master and mirror master hard disk drive status on systems equipped with a RAID configuration. Use the PuTTy application or Telnet through a remote link to change the disk mirror settings to the default values if required..

**Note:** You must ensure the system status monitor service is running to monitor primary master / mirror master disk operation and disk mirroring activity.

1. Access the Mirror disk menu screen as described in "Access disk mirroring through PuTTy or Telnet" on page 385.
2. Select option 6: Drive status from the Mirror disk menu screen.
   The system displays the Mirror drive status menu screen (see Figure 229 on page 393.
3. Select option 1: Show drive status.

**Figure 229** Mirror drive status menu screen


BCM Initialization
Nortel Networks
Business Communications Manager
Mirror Drive Status Menu
1. Show Drive Status
R. Return to previous menu.
DupliWin.Dll Version No. = 91
Primary Master Status = 1 Passed
Mirror Master Status = 1 Passed
Initialization Status = 1 Idle
Press any key to return to menu...

| Status field | Description |
|---|---|
| DupliWin.dll version | Displays the RAID software version. The latest load always has the latest RAID software. |
| Primary master status | Displays the status of the primary master disk (Passed / Failed / NA).<br>• If the field indicates Passed, the drive is operating normally<br>• If the field indicates Failed, check the power and IDE ribbon cable connections or replace the faulty hard disk<br>• If the field indicates N/A (not available) check the hard disk power and IDE ribbon cable connections |
| Mirror master status | Displays the status of the mirror master disk (Passed / Failed / NA)<br>• If the field indicates Passed, the drive is operating normally<br>• If the field indicates Failed, check the power and IDE ribbon cable connections or replace the failed hard disk<br>• If the field indicates N/A (not available) check the hard disk power and IDE ribbon cable connections |
| Initialization status | Displays the mirror data rebuild progress (idle / started) |

4 This procedure is complete.

## Reset to default disk mirror settings using PuTTy or Telnet

Use this procedure to reset the system to use the disk mirror default settings on systems equipped with a RAID configuration. Use the PuTTy application or Telnet through a remote link to change the disk mirror settings to the default values if required..

**Note:** You must ensure the system status monitor service is running to monitor primary master / mirror master disk operation and disk mirroring activity.

1 Access the Mirror disk menu screen as described in “Access disk mirroring through PuTTy or Telnet” on page 385.

2 Select option 7: Default settings from the Mirror disk menu screen. The system displays a confirmation that the default settings are restored.

**Figure 230** Mirror drive status menu screen

3 Power recycle the Business Communications Manager for any changes to take effect.

4 This procedure is complete.

# Business Communications Manager does not Function

The Business Communications Manager can experience a complete failure for any of the following reasons:

- Power supply failure
- Incorrect power supply connections
- AC power failure

# Emergency Telephone Does Not Function

If the emergency telephone is connected to the system, use the following procedure:

1. Check the power LED on the ASM 8 to check that the ASM 8 is receiving power.
2. Check that the emergency telephone has dial tone.
3. Check the external line and emergency telephone connections.
4. To avoid damage to the emergency telephone, connect the telephone directly to the external line and check for dial tone.
5. Replace the MSC.
6. This procedure is complete.

If the emergency telephone is connected to the CTM, use the following procedure:

1. Check that the system has a CTM installed.
2. Check that there is no dial tone at the emergency telephone.
3. Replace the CTM.
4. This procedure is complete.

# ATA 2 Does Not Function

If the Business Communications Manager ATA 2 does not function. Follow these steps to troubleshoot the problem.

1. Make sure there is ac power connected to the ATA 2 unit.
2. Make sure that ATA 2 is in the Tones OFF mode. (For Data Applications only).
3. Correctly configure the ATA 2 telephone port for data communication.
4. Allow sufficient start up time.
5. Assign the prime line.
6. Assign a ringing line if required, for example, auto-answer modems, FAX.
7. This procedure is complete.

## Check the ATA 2 wiring

Check the following connections:

1. ATA 2 to the terminal. The resistance must be 200 ohms or less for data applications and 1,300 ohms or less for voice applications.
2. Business Communications Manager system to ATA 2. The wiring must be equivalent to 800 m of 0.5 mm wire (2,600 ft. of 24 AWG) or less. Do not use bridge taps and loading coils between the Business Communications Manager system and ATA 2.
3. External line to the Business Communications Manager system. Ensure the external line is correctly connected to the Business Communications Manager system and make sure there is dial tone.
4. This procedure is complete.

## Check for dial tone at the ATA 2

Check to ensure there is dial tone from the set and from the ATA 2 module.

1. If there is no dial tone, replace a analog telephone for the data communication device.
2. If there is no dial tone at the ATA 2 unit:
   a. Disconnect the line side of ATA 2. Connect an Business Communications Manager telephone to the ATA 2 port.
   b. Check that the connection from ATA 2 to the Business Communications Manager system is functioning correctly (the telephone has dial tone).
3. This procedure is complete.

## Check for trunk line dial tone to the ATA 2

Use the following steps to check for trunk line dial tone to the ATA 2.

1. Disconnect ATA 2 external line from the Business Communications Manager system and connect the data device directly to this external line.
2. Make a call.
3. If the problem continues, the device or the external line is possibly at fault.
4. Plug the device into a different line.
5. If the problem continues, the device is possibly at fault.
6. This procedure is complete.

For more information about ATA 2, contact your customer service representative.

# Appendix A
# System Region Attributes

This section provides describes some of the differences in the system defaults. These defaults are set based on the region or telphony or CallPilot template that you select in the Quick Start wizard when the system is first configured. Each region is designed using a set of system defaults that provide specific functionality for the geographical area in which the system is deployed..

This section describes the following main topics:


- "Regional Default System Values" on page 397
- "ISDN Line Services" on page 404
- "Define Time Zones by Country and Language" on page 405
- "System Defaults" on page 406
- "BRI and PRI line types" on page 410
- "CallPilot regions" on page 412


## Regional Default System Values

Each region requires a unique set of system default values. The system defaults provide specific functionality for the region in which the system is deployed and includes the following:

- specific languages
- specific order in which the languages are set as default (language 1)
- whether Companion or DECT mobility are allowed
- the type of trunks

This section describes the following topics:


- "Regional core software" on page 398
- "Regional language default values" on page 398
- "Regional caller ID display formats" on page 399
- "Regional companding law" on page 400
- "Regional mobility services" on page 400
- "Regional media bay module availability" on page 401
- "Regional FEM-trunk module combinations" on page 402
- "Regional PRI line protocol support" on page 403
- "BRI and PRI line types" on page 410
- "Dialing plan defaults" on page 408

## Regional core software

Each region setting requires a specific core software load to perform correctly. Table 64 shows the core software available for each region.

**Table 64** Core software defined by region and carrier profile

| Core Software (Carrier s/w ID) | Region |
|---|---|
| T1 CT2 | Carribbean, Hong Kong North America, Taiwan |
| T1 Etiquette | Carribbean, Hong Kong North America, Taiwan |
| E1 Euro | Denmark, Europe, France, Germany, Holland, Italy, Norway, Spain, Sweden, Switzerland, United Kingdom |
| E1 Global | Australia, Brazil, CALA, Global, PRC |
| E1 CALA | Australia, Brazil, CALA, Global, PRC |
| South American and Central American countries are assigned to regions in the following way:<br>• Caribbean includes Antigua, Bahamas, Barbados, Bermuda, Cayman Islands, Dominican Republic, Jamaica, USVI, Puerto Rico, and Trinidad<br>• CALA refers to all other Caribbean and Latin American countries with European-based standards. | |

## Regional language default values

Table 65 lists the languages available for each region and the order in which the languages are set as default.

**Table 65** Default languages by region

| Region | Language priority | | | |
|---|---|---|---|---|
| • Australia • United Kingdom | 1. UK English | | | |
| • Brazil | 1. Portuguese | 2. NA English | | |
| • CALA • North America<br>• Caribbean • PRC<br>• Hong Kong • Taiwan | 1. NA English | 2. NA French | 3. NA Spanish | |
| • Denmark | 1. Danish | 2. Norwegian | 3. Swedish | 4. NA English |
| • France | 1. Euro French | 2. NA English | | |
| • Germany | 1. German | 2. NA English | | |
| • Global | 1. NA English | 2. NA French | 3. NA Spanish | 4. Turkish |
| • Holland | 1. Dutch | 2. Euro French | 3. NA English | |
| • Italy | 1. Italian | 2. NA English | | |
| • Norway | 1. Norwegian | 2. Swedish | 3. Danish | 4. NA English |
| • Spain | 1. Euro Spanish | 2. NA English | 3. Portuguese | |
| • Sweden | 1. Swedish | 2. Norwegian | 3. Danish | 4. NA English |
| • Switzerland | 1. German | 2. Euro French | 3. Italian | 4. NA English |

Table 66 shows the language support for South American and Central American countries.

**Table 66** South/Central America language support

| Language | Country | | | |
|---|---|---|---|---|
| **English** | • Anguilla<br>• Antigua<br>• Aruba<br>• Bahamas<br>• Barbados<br>• Belize | • Bermuda<br>• Cayman Islands<br>• Curacao<br>• Dominica<br>• Grenada<br>• Guyana | • Montserrat<br>• St. Kitts<br>• St. Lucia<br>• St. Maarten<br>• St. Thomas<br>• St. Vincent | • Suriname<br>• Turks & Caicos<br>• Trinidad<br>• USVI |
| **French** | • Haiti | | | |
| **Spanish** | • Argentina<br>• Bolivia<br>• Chile<br>• Columbia<br>• Costa Rica | • Dominican Republic<br>• El Salvador<br>• Ecuador<br>• Guatemala<br>• Honduras | • Jamaica<br>• Mexico<br>• Nicaragua<br>• Panama<br>• Paraguay | • Puerto Rico<br>• Peru<br>• Uruguay<br>• Venezuela |

## Regional caller ID display formats

The Caller ID function is supported on telephones that provide a display window. Caller ID format can consist of the name and DN of the calling party. For further information on compatible telephones and auxillary equipment, refer to “Telephones and adapters” on page 91.

The North American region supports the following format: 5554775 (613)

All other regions display the numbers in a continuous string of a maximum of 14 characters: 6135554775

## Regional companding law

Table 67 shows the companding (compression and expansion) law used for each region. The Mu-law (µ-law) companding standard is common to Asia and North America. The A-law companding standard is common to Europe, Central and Latin America and the United Kingdom.

**DECT systems**: Ensure DECT systems that require mu-law have the correct region setup before you install the DECT system. Refer to the *DECT Installation and Maintenance Guide* for details.

**Table 67** Companding law by region

| Companding law | Region | | | |
|---|---|---|---|---|
| **µ-law** | • Caribbean | • Hong Kong | • North America | • Taiwan |
| **A-law** | • Australia<br>• Brazil<br>• CALA<br>• Denmark | • France<br>• Germany<br>• Global<br>• Holland | • Italy<br>• Norway<br>• PRC<br>• Spain | • Sweden<br>• Switzerland<br>• United Kingdom |

## Regional mobility services

Table 68 shows the Mobility services that are supported by the Business Communications Manager, and the regions that can use each type.

**Table 68** Mobility services by region

| Mobility service | Region | | | |
|---|---|---|---|---|
| Companion (CT2-Plus, Etiquette)<br>DECT | • Taiwan | | | |
| Companion (CT2-Plus) | • CALA | • Brazil | | |
| Companion (CT2-Plus, Etiquette) | • Caribbean | • Hong Kong | • North America | • PRC |
| DECT | • Australia<br>• Denmark<br>• France | • Germany<br>• Global<br>• Holland | • Italy<br>• Norway<br>• Spain | • Sweden<br>• Switzerland<br>• United Kingdom |

## Regional media bay module availability

Some of the media bay modules are customized for a specific type of line and are not available to all regions. Table 69 lists a cross-reference between regions and the type of modules that can be used within the related area.

**Table 69** Module availability, by profile

| Region | DSM 16+/ DSM 32+ | ASM/ ASM 8+ | CTM4/ CTM8 | 4X16 | BRI | DTM | DECT | DDIM | GATM 4/ GATM 8 |
|---|---|---|---|---|---|---|---|---|---|
| Australia | ✓ | | | | ✓ | ✓ | ✓ | | ✓ |
| Brazil | ✓ | | | | ✓ | ✓ | | | ✓ |
| Caribbean | ✓ | | ✓ | ✓ | ✓ | ✓ | | | |
| CALA | ✓ | | ✓ | ✓ | ✓ | ✓ | | | |
| Denmark | ✓ | | | | ✓ | ✓ | ✓ | | |
| France | ✓ | | | | ✓ | ✓ | ✓ | | |
| Germany | ✓ | | | | ✓ | ✓ | ✓ | | |
| Global | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Holland | ✓ | | | | ✓ | ✓ | ✓ | | |
| Hong Kong | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Italy | ✓ | | | | ✓ | ✓ | ✓ | | |
| North America | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Norway | ✓ | | | | ✓ | ✓ | ✓ | | |
| PRC | ✓ | | ✓ | ✓ | ✓ | ✓ | | | |
| Spain | ✓ | | | | ✓ | ✓ | ✓ | | |
| Sweden | ✓ | | | | ✓ | ✓ | ✓ | | |
| Switzerland | ✓ | | | | ✓ | ✓ | ✓ | | |
| Taiwan | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| United Kingdom | ✓ | | | | ✓ | ✓ | ✓ | | ✓ |

## Regional FEM-trunk module combinations

Trunk Modules may be connected to the Business Communications Manager system using the Fiber Expansion Module (FEM). The following table provides a cross-reference between regions and the Trunk Modules you can connect to the FEM.

**Table 70** Trunk availability, by region

| Region | BRI S/T 2/4 | BRI U2/4 | Analog DID | Analog E&M | Analog CLID | Country- specific analog trunk card |
|---|---|---|---|---|---|---|
| Australia | ✓ | | | | | ✓ |
| Brazil | ✓ | | | | | |
| CALA | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Caribbean | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Denmark | ✓ | | | | | |
| France | ✓ | | | | | ✓ |
| Germany | ✓ | | | | | ✓ |
| Global | ✓ | | | ✓ | ✓ | |
| Holland | ✓ | | | | | ✓ |
| Hong Kong | ✓ | | ✓ | ✓ | ✓ | |
| Italy | ✓ | | | | | |
| North American | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Norway | ✓ | | | | | |
| PRC | ✓ | | | ✓ | ✓ | |
| Spain | ✓ | | | | | |
| Sweden | ✓ | | | | | |
| Switzerland | ✓ | | | | | |
| Taiwan | ✓ | | ✓ | ✓ | ✓ | |
| United Kingdom | ✓ | | | | | ✓ |

## Regional PRI line protocol support

Table 71 shows the PRI line protocol support by region.

**Table 71** PRI line protocol supported, by region

| Region | BRI T side | BRI S side | PRI | T1 |
|---|---|---|---|---|
| • Australia | • ISDN ETSI 300 403 | • ISDN ETSI 300 102 | • DASS2<br>• DPNSS<br>• MCDN<br>• ISDN ETSI 300 403,<br>• ETSI QSIG 300 239, | |
| • Brazil • CALA | • ISDN ETSI 300 403, ETSI QSIG 300 239 | • ISDN ETSI 300 102 | • ETSI QSIG 300 239, ISDN ETSI 300 403, MCDN | |
| • Caribbean • North America | • NI-2 | • NI-2 | • NI-2<br>• 4ESS<br>• DMS100<br>• DMS250<br>• MCDN | • Loop<br>• E&M<br>• DID<br>• Ground<br>• Fixed trunk types |
| • Hong Kong • Taiwan | • ITU-T | • ITU-T | • ITU-T | • Loop<br>• E&M<br>• DID<br>• Ground<br>• Fixed trunk types |
| • Denmark • Norway<br>• France • PRC<br>• Germany • Spain<br>• Global • Sweden<br>• Holland • Switzerland | • ETSI QSIG 300 239, ISDN ETSI 300 403 | • ISDN ETSI 300 102 | • DASS2<br>• DPNSS<br>• MCDN<br>• ETSI QSIG 300 239<br>• ISDN ETSI 300 403 | |
| • Italy | • ISDN ETSI 300 102 ETSI QSIG 300 239 | • ISDN ETSI 300 102 | • DASS2<br>• DPNSS<br>• MCDN<br>• ETSI QSIG 300 239<br>• ISDN ETSI 300 102 | |
| • United Kingdom | • ETSI QSIG 300 239, ISDN ETSI 300 403 | • ISDN ETSI 300 102 | • DASS2<br>• DPNSS<br>• MCDN<br>• ETSI QSIG 300 239<br>• ISDN ETSI 300 403 | |

# ISDN Line Services

Table 72 shows the ISDN private network services that are supported by the Business Communications Manager. Table 73 shows the network-based ISDN supplementary services and the features available for each.

**Table 72** ISDN line services

| MCDN over PRI (SL-1) | DPNSS | DASS2 | ETSI QSIG |
|---|---|---|---|
| • Basic Call<br>• DDI<br>• Name display<br>• Number display<br>• Centralized voice mail<br>• Camp-on<br>• ISDN Call Connection Limit<br>• Network Call Transfer<br>• Break-in<br>• Trunk Route Optimization (TRO)<br>• Trunk Anti-Tromboning | • Basic Call<br>• DDI<br>• Diversion<br>• Redirection<br>• Centralized voice mail<br>• Call Offer<br>• Loop avoidance<br>• Executive Intrusion<br>• Three Party<br>• Route Optimization | • Basic Call<br>• DDI<br>• Originating line identity (OLI)<br>• Terminating Line Identity (TLI)<br>• Call Charge Indication (CCI)<br>• Call Charge Rate Indication (CCRD) | • Basic Call<br>• DDI<br>• Name display<br>• Number display |

**Table 73** ISDN services by Protocol

| Protocol | Region | | Available ISDN services | |
|---|---|---|---|---|
| • NI | • Caribbean | • North America | • Basic Call<br>• DID<br>• Name display | • Number display<br>• ONN blocking |
| • ETSI Euro | • Australia<br>• CALA<br>• Denmark<br>• France<br>• Germany<br>• Global<br>• Holland<br>• Hong Kong | • Italy<br>• Norway<br>• PRC<br>• Spain<br>• Sweden<br>• Switzerland<br>• Taiwan<br>• United Kingdom | • Basic Call<br>• DDI<br>• sub addressing (on S-loop)<br>• ETSI Call Diversion (partial rerouting) | • AOC-E (specific changes for Holland and Italy)<br>• MCID<br>• CLIP<br>• COLP<br>• CLIR |

# Define Time Zones by Country and Language

Time zones are based on the actual time zone where the Business Communications Manager is located. The Time Zone dropdown list on the initialization screen, allows you to choose a compatible time zone. If your exact location is not on the list, choose the one with the time zone closest to you. Note that some time zones are individualized because they do not switch from Standard Time to Daylight Saving Time. For example, this is the case for Saskatchewan.

The format of the time and date changes are based on the prime language of the region. Table 74 provides a list of formats based on language or country.

**Table 74** Time/date formats based on language

| Language/Country | Time/Date format |
|---|---|
| Danish | 2001-01-01 13:57 |
| Dutch | 1 Jan 01 13:57 |
| EuroFrench | 1 jan 13:57 |
| EuroSpanish, Brazil | 1 Ene 13:57 |
| German | 1 Jan 13:57 |
| Italian | 1 Gen 13:57 |
| NA English | Jan 1 1:57 pm |
| NA French | 2001-01-01 13:57 |
| NA Spanish | Ene 1 1:57 pm |
| Norwegian | 1 Jan 13:57 |
| Swedish | 2001-01-01 13:57 |
| Turkish | 1 Ock 13:57 |
| UK English | 1 Jan 1:57 pm |

# System Defaults

Table 75 compares the system defaults for the North American, Global and UK regions. In addition, the following functionality applies:

- Regions for Denmark, Holland and Sweden are the same as the Global region except for the default to local languages and local tones and cadences.
- The Region for the Caribbean is the same as the North American region except that it supports the M7000 telephone.
- The Region for CALA is the same as the Caribbean region, except NI ISDN is replaced by ETSI ISDN (u-law).
- The Region for Europe is the same as the United Kingdom region except there are no default dialing restrictions, and ATA parameters are set to European values.

**Table 75** Region defaults

| Functionality | Attribute | North American | Global | United Kingdom |
|---|---|---|---|---|
| Direct Dial Access code | | 0 | 0 | 0 |
| DTMF parameters | Tone duration | 120 msec | 120 msec | 120 msec |
| | Pause time | 1.5 | 1.5 | 3.5 |
| | Interdigit time | 80 msec | 80 msec | 100 msec |
| Conference tone | | disabled | disabled | enabled |
| Call Back Kill time | | 180 sec | 180 sec | 360 sec |
| PCM Companding Law | | mu-law | a-law EBI | a-law EBI |
| Race Integration | | disabled | disabled | disabled |
| OLI digits | | fixed 10 digits | fixed 10 digits | variable length a maximum of 8 |
| Dial Tone Detection | | enabled | enabled | enabled |
| Hunt Groups | Show in second | disabled | disabled | disabled |
| | Default delay | 4 ring cycles | 4 ring cycles | 4 ring cycles |
| | Queue timeout | 60 sec | 60 sec | 60 sec |
| | If busy | busy tone | busy tone | busy tone |
| | Mode | broadcast | broadcast | sequential |
| Target line if busy setting | | prime | prime | busy tone |
| M7000 set | | disabled | enabled | enabled |
| Fax switch | | enabled | enabled | enabled |
| Service Schedule time | Night | start 23:00<br>end 07:00 | start 23:00<br>end 07:00 | start 23:00<br>end 07:00 |
| | Evening | start 17:00<br>end 23:00 | start 17:00<br>end 23:00 | start 17:00<br>end 23:00 |
| | Lunch | start 12:00<br>end 13:00 | start 12:00<br>end 13:00 | start 12:00<br>end 13:00 |

**Table 75** Region defaults (Continued)

| Functionality | Attribute | North American | Global | United Kingdom |
|---|---|---|---|---|
| | Service 4 | start 00:00<br>end 00:00 | start 00:00<br>end 00:00 | start 00:00<br>end 00:00 |
| | Service 5 | start 00:00<br>end 00:00 | start 00:00<br>end 00:00 | start 00:00<br>end 00:00 |
| | Service 6 | start 00:00<br>end 00:00 | start 00:00<br>end 00:00 | start 00:00<br>end 00:00 |
| Call Forward Delay | Show in second | disabled | disabled | disabled |
| | Default | 4 ring cycles | 4 ring cycles | 2 ring cycles |
| | Options | • 2 ring cycles<br>• 3 ring cycles<br>• 4 ring cycles<br>• 6 ring cycles<br>• 10 ring cycles | • 2 ring cycles<br>• 3 ring cycles<br>• 4 ring cycles<br>• 6 ring cycles<br>• 10 ring cycles | • 2 ring cycles<br>• 3 ring cycles<br>• 4 ring cycles<br>• 6 ring cycles<br>• 10 ring cycles |
| DRT Delay | Show in second | disabled | disabled | disabled |
| | Default | 4 ring cycles | 4 ring cycles | 4 ring cycles |
| | Options | • 1 ring cycles<br>• 2 ring cycles<br>• 3 ring cycles<br>• 4 ring cycles<br>• 6 ring cycles<br>• 10 ring cycles | • 1 ring cycles<br>• 2 ring cycles<br>• 3 ring cycles<br>• 4 ring cycles<br>• 6 ring cycles<br>• 10 ring cycles | • 1 ring cycles<br>• 2 ring cycles<br>• 3 ring cycles<br>• 4 ring cycles<br>• 6 ring cycles |
| Handsfree | | none | none | none |
| Pickup Group | | none | none | none |
| Remind Delay | | 60 secs | 60 secs | 60 secs |
| Allow SLR | | disabled | disabled | disabled |
| Transfer Callback | Show in second | disabled | disabled | disabled |
| | Default | 4 ring cycles | 4 ring cycles | 4 ring cycles |
| | Options | • 3 ring cycles<br>• 4 ring cycles<br>• 5 ring cycles<br>• 6 ring cycles<br>• 12 ring cycles | • 3 ring cycles<br>• 4 ring cycles<br>• 5 ring cycles<br>• 6 ring cycles<br>• 12 ring cycles | • 3 ring cycles<br>• 4 ring cycles<br>• 5 ring cycles<br>• 6 ring cycles<br>• 12 ring cycles |
| Dialling Plan | | market dependent (defined in application but controlled by market profile ID) | market dependent (defined in application but controlled by market profile ID) | market dependent (defined in application but controlled by market profile ID) |
| ONN Blocking | VSC for analog tone | n/a | n/a | 141 |
| | VSC for analog pulse | n/a | n/a | 141 |

**Table 75** Region defaults (Continued)

| Functionality | Attribute | North American | Global | United Kingdom |
|---|---|---|---|---|
| | VSC for BRI | n/a | n/a | 141 |
| | VSC for PRI | n/a | n/a | 141 |
| | State for BRI/ PRI | n/a | n/a | send feature code |
| Default CO lines | | 2 | 2 | 4 |
| UTAM | | enabled | disabled | disabled |
| | Portable credits | 0 | defined in the application (max) | n/a |
| Release reason | Release text | none | none | detail |
| | Release code | disabled | disabled | disabled |
| | Display duration | 3 sec | 3 sec | 3 sec |
| Overlap Receiving | | disabled | enabled | disabled |
| Local Number length for ISDN overlap receiving | | 8 | 8 | 8 |
| Tandem alerting | | disabled | disabled | disabled |
| TON/NPI | | national/E.164 | national/E.164 | unknown/unknown |
| National number length | | 10 | 10 | 0 |
| national number prepend | | n/a | n/a | 0 |
| Provide tone on PRI | | enabled | n/a | disabled |

## Dialing plan defaults

Some profiles have default restriction dialing filters. The table below lists the filters for these profiles.

**Table 76** Default dialing restrictions, by profile

| Profile | Restriction filter # | Restriction/ override | Restriction/ override | Restriction/ override | Restriction/ override | Restriction/ override | Restriction/ override |
|---|---|---|---|---|---|---|---|
| **UK** | 1 | 0/0600 | 1 | 010 | | | |
| | 5 | 010 | 1 | 00 | | | |
| | 6 | * | | | | | |
| **North America** | 1 | 0 | 1/1800, 1877, 1888 | 911/911 | 9411 | 976 | 1976 |
| | | 1***976 | 1900 | 1***900 | 5551212 | | |
| **Hong Kong** | 1 | 00*** | 170 | 172 | 173 | 1747 | 1760 |
| | | 1761 | 1766 | 1770 | 1771 | 1772 | 1775 |
| | | 1778 | 1783 | 1788 | 900 | | |

**Table 76** Default dialing restrictions, by profile

| Profile | Restriction filter # | Restriction/ override | Restriction/ override | Restriction/ override | Restriction/ override | Restriction/ override | Restriction/ override |
|---|---|---|---|---|---|---|---|
| **Australia** | 1 | 0/013 | 1/13, 1800 | | | | |
| | 5 | 00 | 1/13, 11, 1800 | | | | |
| | 6 | * | | | | | |

# BRI and PRI line types

Table 77 provides a description of the types of lines that BRI and PRI trunks can provide. The following table provides a description of the types of lines that BRI and PRI trunks can provide. These are set under **Resources**, **Media Bay Modules**, **Bus XX**, **Module X** on the Unified Manager.

Note that some of these line types are only available when specific regions are chosen..

**Table 77** BRI and PRI line types (DTM and BRI modules)

| Digital trunk types | Description |
|---|---|
| T1 | Digital line that carries data on 24 channels at 1.544 Mbps (North American); 30 channels at 2,048 Mbps (Europe)<br>Loop, E&M, DID and ground start lines are also versions of T1 lines.<br>You can program auto-answer T1 loop start, T1 E&M trunks, T1 DID, T1 ground start trunks, PRI and IP trunks to map to target lines to provide for attendant bypass (calling directly to a department or individual) and line concentration (one trunk can map onto several target lines). |
| DID | This is a type of T1 trunk line that allows an outside caller to dial directly into a line on the Business Communications Manager. |
| Loop | This is a type of T1 line. This type of line is used on systems where the service provider supports disconnect supervision for the digital loop start trunks.<br>These trunks provide remote access to the Business Communications Manager from the public network. This trunk must have disconnect supervision to allow the trunk to be set to auto-answer, which provides the remote access portal. |
| Ground | T1-groundstart trunk<br>These lines offer the same features as loop start trunks, but are used when the local service provider does not support disconnect supervision for digital loop start trunks. Ground start trunks work with T1 only. By configuring lines as ground start, the system will be able to recognize when a call is released at the far end. |
| E&M | T1 and E&M. This type of trunk line is used to create simple network connections to other phone systems.<br>This trunk always operates in a disconnected supervised mode. |
| PRI | ISDN interface with 23 B channels and 1 D channel at 1.544 MBps (in Europe: 30 B channels and 2 D channels at 2.048 Mbps)<br>This is the module that controls system timing.<br>These lines give you incoming and outgoing access to an ISDN network and are auto-answer trunks, by default.<br>These lines provide a fast, accurate and reliable means of sending and receiving data, images, text and voice information. using PRI lines allows for faster transmission speeds and the addition of a variety of powerful business applications, including remote LAN access, video conferencing, file transfer and internet access. |
| BRI | ISDN loop that provides both T, S and U2 and U4 (region-specific) reference point loops.<br>These loops can support both network (T and S loops) and terminal equipment (S loop) connections.<br>This type of line provides incoming and outgoing access to an ISDN network. ETSI ISDN BRI is the European Telecommunications Standards Institute specification for BRI ISDN service. BRI provides two bearer B-channels operating at 64 kbits/s and a data D-channel which operates at 16 kbits/s. The D-channel is used primarily to carry call information. Like loop start trunks, BRI lines can be configured as manual-answer or auto-answer. |

**Table 77** BRI and PRI line types (DTM and BRI modules) (Continued)

| Digital trunk types | Description |
|---|---|
| DASS2 | (British) Trunk provides multi-line IDA interconnection to the British Telecom network. |
| DPNSS | (international term: Q.Sig or Q.931) a digital private network signaling system which allows phone systems from different manufacturers to be tied together over E1 lines, offering significant enhancements to Business Communications Manager networking capabilities.<br>DPNSS makes it easier to support centralized network functionality within private networks, for operators and attendants dealing with large numbers of calls. Its routing capabilities provide more of the larger-network capabilities without the expense of installing a new system, re-configuring all the nodes and worrying about a lot of downtime. Most functionality over DPNSS lines is transparent once the DPNSS is programmed into the system.<br>DPNSS allows a local node, acting as a terminating node, to communicate with other PBXs over the network using E1 lines. For example, corporate offices separated geographically can be linked over DPNSS lines to other Business Communications Manager systems, bypassing the restrictions of the PSTNs to which they may be connected. This allows connected Business Communications Manager systems to function like a private network. |
| **Analog trunk types:** | |
| Public | Provides potential access for any set on the system. |
| Private | Provides potential access for a specific set. |

# CallPilot regions

The CallPilot portion of the Business Communications Manager application also has a region setting that defines some call-management-related system defaults.

The CallPilot region is specified at system initialization and start up when you run the Quick Start Wizard. You can also change this setting under **System, Identification**.

The following table lists the default prime language for the countries (regions) where the voice mail application is supported.

**Table 78** CallPilot region default languages by country

| Country | Default voice mail language |
|---|---|
| North America | NA English |
| UK | UK English |
| Australia | NA English |
| Denmark | Danish |
| Holland | Dutch |
| Sweden | Swedish |
| France | Euro French |
| CALA | LA Spanish |
| Caribbean | NA English |
| Europe | UK English |

| Country | Default voice mail language |
|---|---|
| Germany | German |
| Global | NA English |
| Italy | Italian |
| Norway | Norwegian |
| Spain | Spanish |
| Switzerland | German |
| Hong Kong | NA English |
| PRC | Mandarin (Taiwan) |
| Taiwan | Mandarin (Taiwan) |
| Brazil | Portuguese |

The following list are the default settings that are the same for all CallPilot regions:

- Application name string VM
- Group list lead digit 9
- Country log header Access version: %s VM version:
- SC maximum lines 10_20 334
- TA Admin Name Voice Mail
- AMIS enabled
- Bilingualism enabled
- digital network access enabled
- Fax feature available enabled
- AMIS address start key #
- Operator Revert key 0
- Touch Tone Gateway disabled
- Maximum CLID entry 16
- Maximum network length 16

The following table lists the feature default settings that differ among the CallPilot regions.

**Table 79** CallPilot feature default anomalies

| | Mail box login | | Alternate QZ mapping | | Max local number length | | | National Number Length | | | | Maximum CLID display | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Regions** | ** | 88 | False | True | 7 | 8 | 11 | 8 | 9 | 10 | 11 | 7 | 8 | 9 | 16 |
| Australia | | ✓ | | ✓ | | ✓ | | | ✓ | | | | ✓ | | |
| CALA | ✓ | | | ✓ | | ✓ | | ✓ | | | | | ✓ | | |
| Caribbean | ✓ | | ✓ | | ✓ | | | | | ✓ | | ✓ | | | |
| Denmark | | ✓ | | ✓ | | ✓ | | | | | ✓ | | ✓ | | |
| Europe | | ✓ | | ✓ | ✓ | | | | | | ✓ | | | | ✓ |
| France | | ✓ | | ✓ | ✓ | | | | | | ✓ | ✓ | | | |
| Germany | | ✓ | | ✓ | ✓ | | | | | | ✓ | ✓ | | | |
| Global | | ✓ | | ✓ | ✓ | | | | | | ✓ | | | | ✓ |
| Holland | | ✓ | | ✓ | ✓ | | | | | | ✓ | ✓ | | | |
| Hong Kong | ✓ | | ✓ | | | | ✓ | | | ✓ | | | | ✓ | |
| Italy | | ✓ | | ✓ | ✓ | | | | | | ✓ | ✓ | | | |
| North America | ✓ | | ✓ | | ✓ | | | | | ✓ | | ✓ | | | |
| Norway | | ✓ | | ✓ | ✓ | | | | | | ✓ | ✓ | | | |
| PRC | ✓ | | ✓ | | | | ✓ | | | ✓ | | | | ✓ | |
| Spain | | ✓ | | ✓ | ✓ | | | | | | ✓ | ✓ | | | |
| Sweden | | ✓ | | ✓ | | ✓ | | | | | ✓ | | ✓ | | |
| Switzerland | | ✓ | | ✓ | ✓ | | | | | | ✓ | ✓ | | | |
| Taiwan | ✓ | | ✓ | | | | ✓ | | | ✓ | | | | ✓ | |
| UK | | ✓ | | ✓ | | | ✓ | | | | ✓ | | | ✓ | |

# Appendix B
# System Options

The Business Communications Manager system provides a number of software applications that enhance basic functionality. Some of the telephony applications work immediately after you install the Business Communications Manager system. These telephony applications are considered to reside in core software.

Other applications are enabled when you enter software keycodes, which you generate when you purchase one of the applications. Refer to the *Business Communications Manager Software Keycode Installation Guide* for specific directions for entering a code.

This section describes the following main topics:


- "Telephony Features and Options" on page 415
- "Data Features" on page 418


## Telephony Features and Options

The telephony features and options have individual installation and features guides. This section lists the application guides and provides a brief description of the application function.

- *Programming Operations Guide* and *Telephone Features Programming Guide*

  These guides provide programming for core telephony features and user features, such as:

  — Voice telephony configuration for digital, IP, ISDN and radio-based telephones and equipment over analog, digital, ISDN, and voice over IP (VoIP) trunks.

  — How to use and program user telephony features at the telephone

  — Companion Application Server software that controls the interface between the Business Communications Manager system and the Companion wireless system (available for selected regions)

  — Networking DPNSS (upgrade) (requires keycode) provides private voice networking for the UK Market.

  — Networking MCDN and EDSI Q.SIG Voice Networking (requires keycode) allows you to network your Business Communications Manager system, or a number of Business Communications Manager systems to a Meridian system. This allows the network to use a common numbering plan, as well as common voice messaging and auto attendant systems connected to the Meridian.

  — Data setup applications and protocols to configure the Business Communications Manager system to be part of a LAN or WAN network. Refer to the next section for specifics.

- *Call Center Agent User Guide* and *Call Center Supervisor User Guide*

  Nortel Networks Call Center Agents (requires keycode) allows the addition of a specific number of call center agents to your system. Comes in versions for one, four, eight, 16, 32 and 64-seat authorization codes.

- *Call Center Set Up and Operation Guide*
  - — Nortel Networks Call Center (requires keycode)— this Automatic Call Distribution (ACD) system provides tools for handling incoming calls to an agent network. The application also provides administration, supervision, and reporting tools.
  - — Nortel Networks Professional Call Center (upgrade) (requires keycode)— this is an expanded version of the basic Call Center application.
- *Call Center Reporting Set Up and Operation Guide*

  Nortel Networks Call Center Reporting (requires keycode) monitors the statistics of a call center. This application is also compatible with IP wallboards from Itel and SYMON.
- *Call Detail Recording System Administration. Guide*

  Call Detail Recording (no keycode required) records and reports call activity from the Business Communications Manager. You can create reports from this information to help you manage system usage effectively.
- *CallPilot Reference Guide*

  CallPilot is a core Business Communications Manager application. It works with the telephone system to provide automated receptionist service by answering incoming calls and routing them to telephones or mailboxes on the system. This guide explains what the various parts of the CallPilot application do.
- *CallPilot Manager Set Up and Operation Guide* and *CallPilot Programming Record*
  - — CallPilot Manager is the web-based application that you use to set up and administer CallPilot.
  - — Automated Attendant is the CallPilot answering service that answers incoming calls with a Company Greeting, plays a list of options to a caller, and performs call routing functions in response to caller selections.
  - — CallPilot (requires keycodes for additional voice mailboxes) provides a voice mail application as part of the core Business Communications Manager programming. CallPilot provides voice messaging, Automated Attendant, and Custom Call Routing features for Business Communications Manager telephony services.
  - — Voice Mailbox Expansion (requires keycode) allows you to add extra mailboxes to your voice messaging system. The application comes with a keycode that defines how many extra mailboxes are allowed.
- *CallPilot Fax Set up & Operation Guide* and *CallPilot Fax User Guide*

  Fax Suite (requires keycode), a CallPilot optional feature, delivers fax messages to CallPilot mailboxes. Users can use the application to send and retrieve fax messages as easily as they send and retrieve voice messages.
- *CallPilot Message Networking Setup and Operation Guide* and *CallPilot Message Networking User Guide*

  Message Networking (requires keycode to add extra mailboxes) links the CallPilot system with other voicemail systems and allows the exchange of voice messages between users at different sites. CallPilot supports Digital networking using Voice Profile for Internet Messaging (VPIM) standard, and Audio Messaging Interchange Specification (AMIS) networking.

- *CallPilot Desktop Messaging Software Install and Maintenance Guide*

  Desktop Message Networking (requires keycode) provides a multimedia messaging application that works with an e-mail client to provide a single graphical user interface CallPilot voice, fax, and text messages, as well as e-mail messages.

- *DECT Installation and Maintenance Guide (region-specific)*

  The DECT radio-based system allows you to configure up to 32 cordless handsets that communicate through radio base stations deployed around a site. The handsets can be configured as stand-alone sets, or they can be twinned with stationary sets.

- *IP Telephony Configuration Guide*
  - — i2001, i2002, and i2004 IP telephones and the NetVision and NetVision Data telephones require a combination of data and telephony settings to work with the Business Communications Manager. These telephones can make or receive calls through either VoIP or PBX lines.
  - — Nortel Networks i2050 Software Phone turns your PC into a telephone interface which provides standard telephony operating features such as Voice Mail, Caller ID, and multiple telephone lines or line appearances. This application requires Windows 2000, a full duplex sound card, and a computer-telephony headset. This document describes what settings are required to use this application with the Business Communications Manager. The *i2050 Software Phone Installation Guide* provides specific installation information.
  - — VoIP Gateway (requires keycode) converts the voice in a call into a packet format and sends the call using an intranet trunk. With Business Communications Manager VoIP Gateway, you can make calls over any intranet connected to the Business Communications Manager system.
- *LAN CTE Configuration Guide*
  - — LAN CTE (introduced in 2.5 to replace TSP) (requires keycode) provides an interface between a Personal Computer (PC), a telephone, and the Business Communications Manager server that allows third-party software to function on personal computers on the same network as the Business communication manager. This allows customized solutions for such applications as hotel/motel packages or text messaging programs.
  - — TSP (version 2.0 systems only) (requires keycode) supplies the interface between the Business Communications Manager system and Microsoft TAPI. This interface allows you to use TAPI applications on the Business Communications Manager system.
- *Multimedia Call Center Setup and Operation Guide* and *Multimedia Call Center Web Developers Guide*

  Nortel Networks Multimedia Call Center (requires keycode) allows call agents and users to interact through either or both a telephone connection and an IP connection. This allows the conversation to occur over the voice connection or through text chatting. Further, this application allows exchange and viewing of web pages, and allows the agent to show the client screen captures.

- *Personal Call Manager User Guide*

  Personal Call Manager, a TAPI-based application, provides a graphical interface that allows you to use your computer to manage your calls and address book, while still using your telephone for voice communication.

- *Interactive Voice Response Installation and Configuration Guide*

  Interactive Voice Response is an automated telephony application that prompts callers with a combination of recorded menus and prompts, and real-time data from databases. Users enter digits from their touch-tone key pad that directs the Interactive Voice Response application to access databases and play information back to the caller.
  Interactive Voice Response documents include the following:

  - *Media Processing Server Series COMMGR Reference Manual* P0988083
  - *PeriView Reference Manual* P0988083
  - *PeriReporter User's Guide* P0988093
  - *BCM-IVR Integration Supplement* P0995957

# Data Features

The Business Communications Manager offers the following data features as described and configured in the *Business Communications Manager 3.0 Programming Operations* Guide:

- Integrated QoS Routing controls the router interface between the Business Communications Manager system and the local area network, wide area network, and internet.
- **DHCP (Dynamic Host Configuration Protocol)** — Business Communications Manager provides DHCP service to branch office clients. This service dynamically assigns IP addresses to branch office PCs, so you do not manually assign an IP address to each PC. The Business Communications Manager can also be set to use this application as a relay agent to an external DHCP server on the network.
- **DNS (Domain Name System)** — Business Communications Manager functions as both a gateway to the internet and as a DNS proxy for your network. The DNS service allows clients to enter a domain name, such as www.nortelnetworks.com, instead of an IP address when using web browsers.
- **IP Routing** — Business Communications Manager supports the following IP routing protocols:
  - — static routing
  - — RIP (Routing Information Protocol)
  - — OSPF (Open Shortest Path First)
- **IPX Routing** — Business Communications Manager supports the following IPX Routing protocols in a NetWare environment:
  - — static routing
  - — RIP (Routing Information Protocol)
  - — SAP (Service Advertising Protocol)
- **NAT (Network Address Translation)** — Business Communications Manager supports both static and dynamic NAT for a number of packet types and protocols. NAT is a network security feature that translates the IP addresses used within your private network to different IP addresses known to internet users outside your private network.

- **Policy Management** — Business Communications Manager allows you to implement classes of service and assign priority levels to different types of traffic using the DiffServ network architecture. You can configure policies that monitor the characteristics of traffic (for example, its source, destination, and protocol) and perform a controlling action on the traffic when certain user-defined characteristics are matched.
- **VPN (Virtual Private Networks)** — Business Communications Manager uses the PPTP (point to point tunneling protocol) and IPSec (IP security) tunneling protocols to create secure extranets. These secure extranets provide safe transport of data to and from the Enterprise Edge using the public data network (PDN).

# Glossary

**access code**

A unique digit or digits entered by the user to access some telephony features such as Line pools, Call park, external lines, Direct-Dial telephone, and Auto DN.

**address**

A unique identifier assigned to networks and stations that allows each device to receive and reply to messages.

**Analog terminal adapter (ATA)**

A device that connects analog telecommunication devices, such as fax machines, answering machines, and single line telephones to the Business Communications Manager system through a Digital station module.

**Application program interface (API)**

An application program uses this interface to make requests of the operating system or another application. The API is an interface to an operating system or a program.

**asynchronous**

A method of transmission where the time intervals between characters are not required to be equal and signals are sourced from independent clocks with different frequencies and phase relationships. Start and stop bits may be added to coordinate character transfer.

**autodial button**

A memory button that provides one-touch dialing out.

**automatic daylight savings time**

A feature that switches the system to standard or daylight savings time at programmed times. Assigns automatic daylight savings time under **Daylight time** in System programming.

**automatic telephone relocation**

A feature that maintains personal and system programing for a telephone keep when the telephone gets moved to a different modular jack. Enable Automatic Telephone Relocation under Set relocation in System programming.

**auxiliary ringer**

An external telephone ringer or bell which rings when a line or a telephone rings. Enables the auxiliary ringer under **Capabilities** under System DNs programming. Program an auxiliary ringer in **Services** programming.

**B channel (bearer channel):**

An ISDN standard transmission channel used for voice or data transmission. Also known as a media channel.

**background music**

A feature that plays music from the speaker of your telephone. Background Music is available when you attach a music source to the system and enable the feature under Feature settings in System programming.

**base station**

This is the radio/telephony unit that allows communication between wireless handsets, such as Companion or DECT, to the Business Communications Manager system.

**basic rate interface (BRI)**

An ISDN interface that uses two B channels and a D channel (2B+D). ETSI BRI is the European Telecommunications Standards Institute specification for BRI ISDN service

**baud rate**

A unit of measurement of data transmission speed. Baud rate is approximately equivalent to Bits Per Second (BPS). Typical baud rates are 300, 1200, 2400, 4800, and 9600.

**BIOS (basic input output system)**

A program contained in Read Only Memory (ROM) that acts as the interface between software programs and the computer hardware.

**bit**

A bit is the smallest unit of information identified by the computer. A bit has one of two values, 0 or 1, to indicate off or on.

**Bus**

A collection of communication lines that carry electronic signals between components in the system.

**Call Forward**

A feature that forwards all the calls arriving at a telephone to another telephone in the system. To have calls forwarded outside the system, use Line Redirection.

**Call Forward No Answer**

A feature that forwards all calls arriving at a telephone to another selected telephone in the system. The system transfers the calls after a specific number of rings. Assign Call Forward No Answer under **Capabilities** in System DNs programming.

**Call Forward On Busy**

A feature that forwards all calls at a telephone to another selected telephone if the original telephone is busy. Assign this feature under **Capabilities** in System DNs programming.

**Call Forward Override**

An automatic system feature that allows the user to call another user and ask that user to stop forwarding calls to their set.

**call log**

An incoming call log accessed through the set that displays the following information for every call:

- sequence number within the Call Log
- name and number of caller
- long distance indication
- call answered indication
- time and date of the call
- number of repeated calls from the same source
- name of the line that received the call

**Camp-on**

A feature that allows the user to reroute a call to a telephone when all the lines on that telephone are busy. To answer a camped call, use Call Queuing or select a line if the camped call appears on the set. Queued calls get priority over camped calls.

**camp timeout**

The length of a delay before a camped call returns to the telephone that camped the call. Set the length of delay under Feature settings in System programming.

**central answering position (CAP)**

An M7324 telephone that provides backup answering and set monitoring. Assign a CAP under CAP assignment in System programming.

**channel service unit (CSU)**

A device on the Digital Trunk Interface that is the termination point of the T1 lines from the T1 service provider. The CSU collects statistics on the quality of the T1 signal. The CSU ensures network compliance with FCC rules and protects the network from harmful signals or voltages.

**client**

A client is a computer system or process that requests a service of another computer system or process. For example, a workstation requesting the contents of a file from a file server is a client of the file server.

**cold start**

A cold start occurs when you lose all system programming, or if the system was down for maintenance and you want to start it up again.

**Companion portable telephone**

Hand held wireless telephones that allow complete mobility within the reach of Companion base stations or an external antenna. Portable telephones provide many but not all standard system features. They also share some of the same programming as desk telephones.

**Companion Wireless**

The name for the communication systems which use radio technology to transmit and receive signals between its components and the Business Communications Manager.

**Conference**

A feature that allows the user to establish a three-way call.

**D channel (Data channel)**

An ISDN standard transmission channel which is packet-switched. The channel is used for call setup, signaling, and data transmission.

**data link connection indentifier (DLCI)**

The DLCI is used to identify a PVC in frame relay networks.

**DECT cordless telephone system**

Hand held wireless telephones that allow complete mobility within the reach of DECT base stations. Portable telephones provide many but not all standard system features. They also share some of the same programming as desk telephones.

**Delayed Ring Transfer (DRT) to prime**

This feature allows the system to transfer unanswered calls on external line to the prime telephone related to the called set. The number of rings can be adjusted. Activate this feature under Feature settings in System programming.

**dial-up connection**

A dial-up connection is a temporary connection between computers. This connection is established over an analog or digital telephone line.

**dialing restriction**

Restrictions are numbers you cannot dial when the dialing filter with those numbers is in effect.

**Digital Private Network Signaling System (DPNSS)**

DPNSS is a networking protocol that provides operators with access to Enterprise Edge features over multiple combined networks. Corporate offices, separated geographically, can be linked over DPNSS to other Enterprise Edge systems, bypassing the restrictions of the PSTNs to which they may be connected. This allows connected Enterprise Edge systems to function like a private network. DPNSS is available for International systems only.

**directory number (DN)**

A unique number that the Business Communications Manager system assigns to every telephone or data terminal.

**disconnect supervision**

A feature that enables the system to detect if an external caller hangs up. Enable Disconnect Supervision under Trunk/Line data in Lines programming.

**Do Not Disturb**

A feature that stops calls from ringing at a telephone. Only Priority Calls ring at the telephone when this feature is set. A line button flashes when a call is received, but the set does not ring.

**domain name**

The domain name is used to translate Internet IP addresses into common language to allow for easier user access.

**Domain Name Server (DNS)**

The domain name system or server is the system that maps names of objects into IP numbers or other resource record values.

**dual tone multifrequency (DTMF)**

Two distinct telephone signaling tones used for dialing.

**dynamic IP address**

This feature is provided by an IP address server which assigns an IP address to a computer every time it logs on to the network.

**Emergency 911 dialing**

The ability to access a public emergency response system by dialing the digits 9-1-1.

**emergency telephone**

A single-line telephone that becomes active when there is no power to the Business Communications Manager. This telephone is also referred to as a 500/2500 telephone.

**Ethernet**

A local area network that networks computers with coaxial cable or twisted pair wiring. This protocol makes use of Carrier Sense Multiple Access/Collision Detect (CSMA/CD) LAN to allow computers, such as the Business Communications Manager to listen for pauses before they communicate.

**event message**

These are messages generated by the system to record activity. The messages are written to the system log.

**external call**

A call to or from a destination outside the Business Communications Manager system.

**external line**

A line assigned to a telephone that allows calls to the PSTN.

**external paging**

A feature that allows voice announcements over an externally-installed loudspeaker connected to the Business Communications Manager. The external speaker is not an Business Communications Manager component.

**FAX**

FAX works with Business Communications Manager Voice Messaging. FAX allows a caller to send a fax document to a voice mailbox.

**feature code**

A unique code used to access Business Communications Manager features and options on the telephones.

**filtering**

Filtering is the process of examining a data packet on the network to determine the destination of the data and whether the packet gets passed along on the local LAN, copied to another LAN, or dropped.

**frame relay**

A frame relay is a high-speed, packet switching WAN protocol designed to provide efficient, high-speed frame or packet transmission with minimum delay. Frame relay uses minimal error detection and relies on higher level protocols for error control.

**gateway**

A system that links two different types of networks and enables them to communicate with each other. The Business Communications Manager can provide the gateway to an intranet or internet.

**ground start trunk**

Ground start trunks provide the same features as loop start trunks. Use this type of trunk when the local service provider does not support disconnect supervision for the digital loop start trunks. By configuring lines as ground start, the system can identify when a caller hangs up the telephone at the far end. Ground start trunks are available only on a Digital Trunk Interface (DTI).

**Handsfree**

A feature used to make calls without using the telephone receiver. Activate Full Handsfree under **Capabilities** in System DNs programming. When activated, the Business Communications Manager assigns a Handsfree/Mute button to the telephone.

**Handsfree (HF) Answerback**

This feature automatically turns on the microphone at a telephone that receives a Voice Call so that the person receiving the call can respond without lifting the receiver. Activate Handsfree Answerback under **Capabilities** in System DNs programming.

**Held (Line) Reminder**

A telephone rings and displays the message `On hold: LINENAM` when you place an external call on hold for programmed period of time.

**host name**

The name that identifies a computer, on a network that provides services to other computers in the domain, such as databases or other Business Communications Manager systems.

**Hotline**

This feature automatically calls a pre-assigned number when the user lifts the telephone receiver or presses the Handsfree/Mute button. Assign Hotline under **Capabilities** in System DNs programming.

**Hypertext Transfer Protocol (HTTP)**

The set of rules used for exchanging text, graphic images, sound, video, and other multimedia files on the world wide web.

**Hz (hertz)**

A unit of measure for indicating frequency in cycles per second.

**Integrated Services Digital Network (ISDN)**

A digital telephone service that allows for a combination voice and data transfer over a single, high-speed connection over the same copper twisted-pair telephone line as analog telephone service.

**intercom button**

A button that provides access to internal lines used for calls within a Business Communications Manager system. These buttons also provide access to external lines through a line pool or external code. Assign intercom buttons under Line access in System DNs programming.

**internal line**

A line on your telephone dedicated to making calls to destinations inside your system. An internal line can connect you with an external caller if you use it to access a line pool. Also, you can answer an external caller using the call handling features such as Call Park or Call Pickup Directed.

**Internet Protocol (IP)**

The protocol that supports data being sent from one computer to another through an interconnection (internet) of networks. IP is a connectionless protocol, which means that there is no established connection between the end points that are communicating.

**IP address**

The internally-assigned address that identifies a destination and transmitting computer over a internet. See also static IP address and dynamic IP address.

**IP address server**

The IP address server manages the assignment of IP addresses to the devices that access the system. The server assigns an IP address to the device whenever it logs on to the network.

**ISDN DN**

A directory number (DN) used by ISDN terminal equipment connected to the system. The Business Communications Manager system uses a maximum of 30 ISDN DNs. The DECT cordless handsets use this type of DN.

**kbyte**

The abbreviation for kilobyte. A kilobyte is equal to 1024 bytes.

**keycode**

These numerical codes, generated for specific applications and for individual sites, allow access to additional features on the Business Communications Manager system. Refer to the Software Keycode Installation guide for details.

**line**

The complete path of a voice or data connection between one telephone, or other device, and another.

**line number**

A number that identifies an external line. The total number of lines depends on the number and type of trunk media bay modules installed.

**line pool**

Lines grouped in a common pool that assigned telephones can access to make external calls. Assign a line to be part of a line pool under Trunk/Line data in Lines programming.

**Line Redirection**

A feature that allows you to redirect all calls on an incoming line to a destination outside the system. You can set up the system to ring briefly when a call comes in on a redirected line, under **Capabilities** in System DNs programming.

This feature is different from Call Forward in two ways. Line redirection redirects only external calls, and redirects calls to destinations outside the system. Call forward redirects calls only to destinations within the system.

**Link**

If the Business Communications Manager system is connected to a Private Branch Exchange (PBX), the Link signal is used to access special features. The Link signal can be included as part of a longer stored sequence on an External Autodial button or in a Speed Dial code. The Link symbol uses two of the 24 spaces in a dialing sequence.

**Local Area Network (LAN)**

A network of interconnected computers, such as the Business Communications Manager, sharing the resources of a single processor or server within a relatively small geographic area.

**mailbox**

A storage place for voice messages on Business Communications Manager Voice Messaging.

**Meridian 1 ISDN Primary Rate Interface**

This is the MCDN protocol which is used between members of the Nortel Networks Meridian family of Private Telecommunication Network Exchanges. The signalling information is carried via time slot 16 of a 2.048 Mbit/s digital transmission system.

**MHz**

A unit of measure indicating frequency in millions of cycles per second.

**microprocessor**

The Central Processing Unit (CPU) component that controls all activity inside the Business Communications Manager.

**modem**

A communications device that allows computers to exchange data over telephone lines.

**music source**

You can connect a radio or other source of music to the system to provide music for the Music on Hold and Background Music features. A music source is not part of the Business Communications Manager system components.

**Network Basic Input/Output System (NetBIOS)**

An interface and upper-level protocol developed by IBM for use with a proprietary adapter for its PC network product. NetBIOS provides a standard interface to the lower networking layers. The protocol provides higher-level programs with access to the network.

**network**

Two or more computers linked electronically to share programs and exchange data.

**network device**

A network device is a hardware entity characterized by its use as a communications component within a network.

**network DN**

A number supplied by the ISDN network service provider for ISDN terminal equipment.

**network interface card (NIC)**

This card is installed inside a computer so the computer can be physically connected to a network device such as the Business Communications Manager server.

**On hold**

A setting that controls what external callers hear: music, tones, or silence, when you place the call on hold. Program On hold under Feature settings in System programming.

**overflow**

A setting in Routing Service that allows users to decide which path an outgoing call takes if all the lines used in a selected route are in use.

**packet**

A packet is a unit of data that is routed between an origin and a destination. Each packet is separately numbered and includes the Internet address of the destination.

*Packet* and *datagram* are similar in meaning. A protocol similar to TCP, the User Datagram Protocol (UDP) uses the term datagram.

**page**

A feature you can use to make announcements over the Business Communications Manager system using the telephone speakers and/or external speakers.

**Page Time out**

A setting that controls how long a Page Announcement can last. Assign the Page Time out under Feature settings in System programming.

**Page zone**

An area in the office that receives internal page announcements that other areas of the office do not hear. Assign telephones to page zones under Capabilities in System DNs programming.

**Parallel port**

A port that transfers data through multiple wires. Parallel ports normally use a 25-pin interface that transmits and receives data using a separate data line for every bit.

**Peripheral Component Interconnect (PCI) Slot**

Socket on the Business Communications Manager main printed-circuit board that connects to the Business Communications Manager cards.

**Personal Speed Dial**

Two-digit codes (71-94) that can be programmed on the set to dial external telephone numbers. You can access Personal Speed dial numbers only at the telephone on which they are programmed.

**Pin-1**

An indicator on the first pin on an electronic component. You use this indicator to help you correctly align the component when attaching or installing it.

**Port**

A connector on the Business Communications Manager that allows data exchange with other devices, such as a printer or mouse.

**portable telephone**

Typically a handset containing keypad, receiver and transmitter that communications using a radio link to a base station connected to the Business Communications Manager. Examples: Companion, DECT.

**Primary Rate Interface (PRI)**

An ISDN interface that uses 23 B channels and a D channel (23B+D).

**Prime line**

The line the system selects for your telephone when you lift the receiver, press the Handsfree/Mute button, or use an external dialing feature. Assign a Prime Line to a telephone under Line access in System DNs programming.

**Priority Call**

If you get a busy signal when you call a person in your office, you can interrupt that person for an urgent call. Enable this feature for a telephone under Capabilities in System DNs programming.

**Private branch exchange (PBX)**

A PBX is a telephone system within an enterprise that switches calls between enterprise users on local lines while allowing all users to share a certain number of external telephone lines. The main purpose of a PBX is to save the cost of requiring a line for each user to the telephone company central office since the PBX is owned and operated by the enterprise rather than the telephone company.

**protocol**

A set of rules and procedures for exchanging data between computers or Business Communications Managers on a network or through the Internet.

**Proxy**

A server that acts on behalf of another.

**pulse/tone dialing**

Pulse is the traditional method of dialing used by rotary-dial or push-button analog telephones. Tone dialing allows telephones to communicate with other devices such as answering machines. You require tone dialing to access the features that PBX systems can provide or to use another system remotely.

**Quality of Service (QoS)**

On the Internet and in other networks, QoS refers to guaranteed throughput level. QoS allows a server to measure, improve and, to some level, guarantee the transmission rates, error rates, and other data transmission characteristics. QoS is critical for the continuous and real-time transmission of video and multimedia information.

**Q reference point signalling (QSIG)**

QSIG is an ETSI standard signalling for multi-vendor peer-to-peer communications between PBXs and/or central offices. This is an International standard and not available in North America.

**Random Access Memory (RAM)**

Computer memory that stores data temporarily. RAM stores the data used by the microprocessor because it executes instructions. The contents of RAM are erased when you restart or turn off the Business Communications Manager.

**RAID**

Redundant array of independent disks. A disk subsystem used to increase performance and/or provide fault tolerance. RAID is a set of two or more ordinary hard disks and a specialized disk controller that contains the RAID functionality.

**Remote access**

The ability to dial into an Business Communications Manager system from outside the system and use selected features. The Class of Service determines which lines, features, and dialing capabilities are available.

**Restriction filter**

Restriction filters prevent selected telephone numbers or feature codes from being dialed. Restriction filters can be applied to lines, sets, specific lines on a set, and to Class of Service passwords.

**Read Only Memory (ROM)**

Memory that stores data permanently. ROM contains instructions that the Business Communications Manager needs to operate. The instructions stored in ROM are used by the Business Communications Manager each time it is turned on or restarted.

**Router**

A device that forwards traffic between networks, based on network layer information and routing tables. A router decides which path network traffic follows using routing protocols to gain information about the network and algorithms to choose the best route based on a routing matrix.

**Routing**

The path a message takes from its origin to its destination on a network or the Internet.

**Serial port**

A port that sends and receives data one bit at a time.

**Software keycode**

Refer to Keycode.

**static IP address**

A static or fixed IP address that is permanently assigned to a computer.

**Station Auxiliary Power Supply (SAPS)**

A device which provides power to a telephone that is more than 300 m (975 ft.) and less than 1200 m (3900 ft.) from the server, or to a CAP module.

**Station media bay module**

Physical units installed in a Business Communications Manager that connect the telephone lines to the system.

**subnet mask**

A value used to route packets on TCP/IP networks. When the IP layer has to deliver a packet through an interface, it uses the destination address contained in the packet, together with the subnet mask of the interface to select an interface, and the next hop in that subnet

**Synchronous**

A synchronous signal is sourced from the same timing reference. A synchronous signal causes the interval between successive bits, characters, or events to remain constant or locked in to a specific clock frequency.

**System speed dial code**

A two-digit code (01 to 70) that you program to dial a telephone number a maximum of 24 digits long. You can program System speed dial codes for the complete system under the **System Speed** heading.

**SSD**

The SSD (system status display) is a LED interface used to visually monitor the status of system components.

**SSM**

The SSM (system status monitor) is a graphical user interface used to monitor, on-line, the status of Business Communications Manager system components.

**T1**

Digital carrier system or line that carries data at 1.544 Mb/s.

**Target lines**

Lines used only to answer incoming calls. A target line routes a call according to digits it receives from an incoming trunk. You refer to target lines in the same way as physical lines.

**Telephony Application Program Interface (TAPI)**

A standard program interface that allows communication over telephones or video phones to people or phone-connected resources elsewhere in the world.

**Transfer**

A feature that allows you to redirect a call to another telephone in your Business Communications Manager system, over a network, or outside your system.

**Transmission Control Protocol/Internet Protocol (TCP/IP)**

A language controlling communication between computers on the Internet.

TCP:

- checks packets of information for errors
- sends requests for re-transmission in the event of errors
- returns multiple packets of a message into the original sequence when the message reaches its destination

IP:

- controls how packets are sent out over networks
- has a packet addressing method that allows any computer on the Internet forward a packet to another computer that is a step or more nearer to the recipient

**Trunk**

The public telephone system or private network connection between the Business Communications Manager system and the outside world.

**Trunk media bay module**

Physical units installed in a Business Communications Manager that connect the system to the outside world.

**User Speed Dial**

Two-digit codes (71-94) programmed to dial external telephone numbers. These numbers are available only at the telephone on which they are programmed.

**V.90**

A data transmission standard used by the modem installed in the Business Communications Manager. This standard allows data to be transmitted to the modem at 56 kbit/s and transmitted from the modem at 33 kbit/s.

**Voice Message Center**

If you have subscribed to Call Display services, you can receive visual Voice Message Waiting Indication on a display telephone. If you have Voice Message Waiting Indication, you can program the telephone numbers required to access a maximum of five external voice message centers. You can program which of the five centers is to be accessed by each specific line.

**Voice over IP (VoIP)**

The capability to deliver voice using the Internet Protocol. In general, this means sending voice information in digital form in discrete packets rather than in the traditional circuit-committed protocols of the public switched telephone network (PSTN).

**Weighted Fair Queuing (WFQ)**

WFQ is a queuing method that allows low volume traffic, such as Telnet, to be given priority. Interactive traffic receives higher priority than batch transfers.

**Wide Area Network (WAN)**

A collection of computers or Business Communications Managers connected or networked to each other over long distances, normally using common carrier facilities.

# Index

## Numerics

2/6 channel split 122
4X16
  combination module, station component 82
  DIP switch settings 127, 133, 134, 141
  DS30 channel hierarchy 128
  hardware description 82

## A

access point
  NetVision system components 94
accessories
  ATA2 318
  CAP 318
ACD
  Call Center 416
  Professional Call Center 416
adding new extensions 120
agents, adding 415
American Society of Composers, Authors and Publishers, Music on Hold licence 6
amphenol connector 81, 82, 83
analog equipment, ATA2 318
analog extensions 120
analog station media bay module, ASM 8 83
analog station modules 81
analog telephone
  ASM 8 and ASM 8+ modules 83
  CTM/CTM8 module 78
Analog Terminal Adapter 2, see ATA2
analog trunk media bay module 78
antenna
  Canada, installation 346
  certification 342
  Co-axial cable, maximum length 348
  directional, installation 347
  external 349
  external installation 342
  indoor 348
  indoor directional external antenna, installation 347
  indoor installation 347
  Lightning surge protector 351
  maximum length cable 352
  omni-directional 348, 349
  outdoor omni-directional external antenna, installation 349
API
  LAN CTE application
  TSP 417
ASM
  DIP switch settings 133, 134
  DIP switch settings (upgraded 2.5 system) 143
  DS30 channel hierarchy 128
  hardware description 83
ATA2
  installing 318
  overview
  power source 360
AudioConference Unit overview 92
automatic telephone relocation 324
auxiliary jack 78

## B

backup power, RPI 327
backups, maintenance warning 218
base station
  clearances 339
  Companion 93
  connecting plug-top power supply 340
  DECT 94
  description 86
  distances 338
  hand-off 338
  indoor antenna 347
  installation 338
  maximum cable 332
  minimum distances 338
  omnidirectional outdoor antenna 349
  positioning 326
  RPI
  T7406 94
  TCM connections 340
  termination board 339
  wiring length, power 332
  wiring RPI 332
base unit
  memory
  replacing the hard disk 218
BNC connector 352
bracket terminal board 339
BRI

DECT module settings 149
DIP switch settings 133, 134, 138
line types 410
network standards 5
BRIM S/T 79
BS-1 download 341
bus numbers, DS30 channel hierarchy 127
Business Communications Manager
4X16 82
4X16 combination module 82
ASM (analog station module) 83
BCM200 Platform Base Hardware 43
BCM400 Platform Base Hardware 45
BRIM S/T(ISDN trunk module) 79
Call Center (requires keycode) 416
Call Detail Recording 416
CTM/CTM8 (Caller ID analog line) 78
data networking components 64
DECT system components 94
DPNSS networking 415
DSM 16 and DSM 32 (digital station module) 81
DTM (digital trunk module) 77
Fax Mail application 416
Field Replaceable Units 40
i2050 soft phone 417
LAN CTE (requires keycode)
Message Networking (requires keycode) 416
NetVision system components 94
Overview 39
Personal Call Manager 417
Professional Call Center (requires keycode) 416
QoS Routing 418
station media bay modules 81
supported adapters 71
supported telephones 71
T7406 system components 94
TSP 417
VoIP Gateway (requires keycode) 417


## C


cables
maximum distance 332
Call Center Agents (key code required) 415
Call Center Agents (requires keycode) 415
Call Center overview 416
Call Center Reporting (requires a keycode) 416
Call Center Reporting (requires keycode) 416
Call Detail Recording 416
call information, recording 416
call statistics, Clarify Call Center Reporting 416
Caller ID
by region 399
internal lines 81
caller-directed transfer, Call Center 416
CallPilot
languages by region 412
Canadian Regulations 6
CAP
installing 318
SAPS cable 93
cells, Companion 93
Central America, supported languages 399
channel split
Companion 128, 326
channel splits 122
chassis ground 182
clear to send 182, 183
clearances, Companion base station 339
coaxial cable 352
companding laws, by region 400
Companion
administration/maintenance tools 327
base station 93, 326, 338, 340
base station authorization software 415
C3050 CT2Plus 327
C3050 Etiquette 327
C3060 327
channel split limitations 128, 326
coverage area, maximum 326
diagnostic software 327
DS30 channels 128
Etiquette C3050 CT2 93
external antenna 349
handset overview 92
indoor antenna 347, 348
install base station 339
installation process overview 101
lightning surge arrestor, install 351
minimum distance, base station 338
portable telephone registration 341
register handset 341
RPI
software 326, 415
UTAM approval 338
UTAM messages 341
Companion 3020 327
Companion Base Station, see base station
components
RPI 331

connecting
WAN card 182
conventions, text 35
copyright, music source 6
cordless
T7406 92
cordless handsets 149
cordless telephones
Companion overview 92
DECT overview 92
NetVision IP telephones 92
CTM
4X16 combination module 82
4X16 settings 141
DIP switch settings 133, 134, 138, 139
network standards 5
overview 78

## D

data carrier detect 182, 183
data networking
modem card 64
data set ready 182, 183
data telephones
NetVision Data telephone 92
data terminal ready 182, 183
DB25 connector 182
DECT
base stations 86
description 87
DIP switch settings 149
DS30 channel hierarchy 128
handset overview 92
installation process overview 101
system components 94
dedicated cable 93
dialing plan
profile defaults 408
digital device compliance 9
digital extensions 120
digital ISDN trunk module 79
digital lines, 4X16 81
digital station media bay module 81
digital station module
4X16 combination module 82
DSM16 overview 87
digital telephone
4X16 module 82
BRIM S/T module 79
DSM 16 and DSM 32 modules 81
DSM16 module overview 87
DTM module 77
digital trunk module
DTM 77
digitizing analog equipment, ATA2 318
DIMM
see also memory
DIP switch settings
ASM 143
BRI 138
CTM 138, 139
DECT settings 149
determining the settings 131
DSM 144
DTM 136
FEM settings 149
offset 123
DIP switches
GATM 140
directional antenna 347
DNs
ASM DIP switch settings 143
DECT 149
default for IP telephony 322
DIP switch settings 136
DSM switch settings 146, 147, 148
see also extensions
start DN 128
DPNSS networking 415
DS30 channels
2-channel modules 127
ASM switch settings (upgraded 2.5 system) 143
BRI switch settings 138
channel split
describing channel splitting 122
Companion 128
CTM switch settings 138, 139
DIP switch settings 131, 133, 134
DSM switch settings 144
DTM switch settings 136
hierarchy 127
offset configurations 123
sharing offsets 123
DSM
4X16 combination module 82
4X16 settings 141
DIP switch settings 133, 134, 144
DS30 channel hierarchy 128
hardware overview 81

DSM 16, description, see also DSM 87
DTM
  description 77
  DIP switch settings 133, 134, 136
  network standards 5
  North American PRI settings 136
dual in-line memory module, see DIMM

## E

E1, DTM modules 77
eCAP 318
electrical shock warning 9
electromagnetic compatibility 5
emergency numbers, programming requirements 8
emergency telephone
  analog auxiliary jack 78
  installing 321
EMI, device compliance 7
EMI/EMC 9
emobility
  NetVision IP telephones 92
entering keycodes 191
environment
  standards and specifications 11
equipment
  malfunction 6
Etiquette C3050 CT2 portable telephone 93
ETSI specifications 11
European components 83
European-only equipment 86
expansion unit
  install on a flat surface 115
extended configurations, CAPs 318
extensions
  DIP switch settings 136
  number required 120
  portable telephones 341
  see also DNs
external antennas 349
external clock 182, 183
external equipment, safety warning 57
external line isolation units (LIU), MSC jacks 57
external paging
  amplifier 58

## F

facility interface code (FIC) 5
fax
  ASM station module 83, 86
  auxiliary jack 78
  Fax Mail 416
  Fax Messaging 416
  Fax On Demand 416
  Fax Overflow 416
FCC
  certification, antennas 342
  compliant cord and plug 7
  device compliance 7
  electromagnetic compatibility 5
  EMI and EMC 9
  hearing aid compatible 5
  network standards 5
  Public Switched Telephone Network 7
  registration 4
  registration number 5
  registration number location 7
  REN on label 8
  RF interference 3
  telecommunications company rights 6
Federal Communications Commission, see FCC
FEM
  connecting to an existing system 121
  DIP switch settings 149
  DS30 channel requirements 126
  fiber ports 149
fiber ports, FEM module 149
fixed set 94
future expansion 120

## G

GATM
  dip switches 140

## H

hand-off, Companion base station 338
handset
  standards and specifications 11
hard disk
  backup warning 218
  initialization 226, 228
  replacement 218
hardware
  MSC 71
  tools warning 218

hearing aid compatible 5, 8
hotels, LAN CTE application

## I

i2001
  installing 322
i2002
  installing 322
i2004
  installing 322
i2050
  installing 322
i2050 soft phone, overview 417
illustration 351
Industry Canada
  registration 4
  regulations 6
input wiring 334
install
  ATA2 318
  base station 339
  CAP 318
  Companion 325
  emergency telephone 321
  lightning surge protector 351
  on table or shelf 113, 115
installing
  IP telephones 322
Integrated QoS Routing 418
International components 91
internet
  network routing software 418
intranet telephony 417
IP telephone
  i2050 soft phone 417
  install chart 322
  overview 92, 417
  VoIP Gateway application 417
ip telephone
  changing the channel split 122
IP telephones
  default DN range 322
  NetVision cordless telephones 92
  NetVision system components 94
ISDN
  line services, by region 404
  trunk module 79

## J

jack
  external paging 58
  page relay 58

## K

keycode
  Call Center 416
  Call Center Agents 415
  Call Center Reporting 416
  DPNSS networking 415
  entering 191
  fax
    Fax Mail 416
  LAN CTE
  MCDN 415
  Message Networking 416
  Multimedia Call Center 417
  Professional Call Center 416
  Q.SIG Voice Messaging 415
  VoIP Gateway 417
KIM (Key Indicator Modules) 318

## L

LAN CTE, overview 417
language
  by region 398
  South and Central America 399
licence, music on hold 6
lightning protector, installation 342
lightning surge arrestor
  installation in Canada 351
limitations
  Companion, channel split 128, 326
line
  BRI and PRI line types 410
line protocol, by region 403
line services
  ISDN support, by region 404
lines
  BRI and PRI line types 410
  module DIP switch settings 136
  protocol by region 403

## M

M7000 (International only) 91
maintenance
  maintain backups 218

MCDN
networking 415
Q.SIG voice networking 415
media bay modules
4X16 settings 141
ASM DIP switch settings (upgraded 2.5 system) 143
availability by regions 401
BRI DIP switch settings 138
CTM DIP switch settings 138, 139
DECT 87
DECT settings 149
DIP switch settings 131
DS30 channel hierarchy 127
DSM DIP switch settings 144
DSM16 overview 87
DTM DIP switch settings 136
FEM settings 149
install overview 100
offset configurations 133, 134
switch offsets 123
system capacity 121
Media Services Card, see MSC
memory button
CAP 318
M7000 91
T7100 91
T7208 91
T7316 91
Message Networking (requires a keycode) 416
minimum distances, Companion base station 338
modem card
auxiliary jack 78
backup to integrated Q0S routing 64
internal, V.90 interface 64
modules
determining DIP switch settings 131
DS30 channel hierarchy 127
offset configurations 133, 134
moving telephones 324
MSC
description 71
Multimedia Call Center (requires a keycode) 417
Multimedia Call Center (requires keycode) 417
music on hold
copyright 6
music source
permission 6

## N

NetVision
access point 94
handset overview 92
installing 322
system components 94
NetVision Phone Administrator (NVPA)
overview 94
network
equipment registration 4
regulatory 6
routing 418
standards 5
networking
connecting WAN 182
DPNSS 415
MCDN (requires keycode) 415
modem card 64
WAN card 62
Nortel Networks address
Nashville, Tennessee 8
Weston, Ontario 7
North American components 81, 83, 91
numbers of extensions 120

## O

off-premises extension 317
offset 123
offset configurations 133, 134
omnidirectional antenna 348, 349
one-line display
T7100 91
T7208 91
optional applications, keycodes 191
OPX 317
output jack 58
overrides
profile defaults 408

## P

page, external paging amplifier 58
paging 58
external output jack description 58
relay jack description 58
PCI
MSC description
standard MSC card 71
peripherals
ATA2 318
CAP 318

Personal Call Manager 417
plug-top power supply on base station 340
polarity, TCM connections 339
portable handset, DECT 94
portable handset, NetVision 94
portable handset, T7406 94
portable telephone
  Companion 327
  Companion installation 341
  DN range 341
  Etiquette C3050 CT2 93
  extension numbers 341
  registration 341
ports
  FEM fiber ports 149
power outage, emergency phone jack 78
power supply
  RPI 328
PRI
  DTM module 77
  line types 410
process map
  hard disk replacement 218
Professional Call Center 416
programming
  moving telephones 324
programming the Companion 327
protective ground 183
PSTN
  service provider 117
PSU, RPI requirements 328
publications
  related 37

## Q

Q.SIG Voice Networking (requires keycode) 415
QoS Routing
  modem card, backup 64
  software 418

## R

radio base station
  Companion 93
  DECT 94
  NetVision 94
  T7406 94
radio reception 9
radio-frequency interference 3
receive clock 182, 183
receive data 182, 183
regions
  caller ID 399
  CallPilot 412
  companding law 400
  ISDN line services support 404
  languages 398
  line protocol 403
  modules 401
  system defaults 406
  voice mail feature defaults 413
registration information for telephone company 5
registration number tag 7
relay jack
  external paging 58
Remote Power Interconnect, see RPI
repair
  authorization 4
  authorized supplier 6
replace
  hard disk 218
request to send 182, 183
restriction filter
  profile defaults 408
RF interference 3
ringer equivalence number 7
Ringer Equivalence Number (REN) 8
RJ11 jacks 78, 83, 340
RJ45 jack 160
RJ48C jack 79
router interface, QoS Routing 418
routing, network 418
RPI
  backup power requirements 327
  cabling distance 332
  clearance 329
  Companion base station
  components 331
  connecting 332
  input connectors 333
  input wiring 334
  maximum cable 332
  mounting 329
  opening 330
  output connectors 333
  overheating 329
  power supply 328

requirements 328
RPI-16 BIX UL 328
RPI-16 BIX wiring chart 336
RPI-8 BIX UL 328
RPI-8 BIX wiring chart 335
turn off before connecting 339
ventilation 329
wiring
input connections 333
output connections 333
wiring charts 335


## S


safety extra low voltage (SELV)
external equipment 57
safety instructions 9
security code, keycode 191
service order code (SOC) 5
sets per line 8
signal ground 183
signal ground/common return 182
software
TSP 417
South America, supported languages 399
specifications
system standards 11
start DN 128
Station Auxiliary Power Supply, see SAPS
station media bay module
4X16 combination module 82
ASM 8 and ASM 8+ modules 83
DSM 16 and DSM 32 81
station modules
ASM switch settings (upgraded 2.5 system) 143
DSM switch settings 144
overview 81
rules for assigning 127
surge protectors 342
Symbol
NetVision system components 94
system capacity 121
system defaults, by region 406


## T


T1
DTM module 77
network interface card 62
T7100 91
T7208 (North America only) 91
T7316 91
T7406, compatible handset 92
T7316E
CAP 318
T7406
system components 94
T7406 telephone overview 92
TAPI
LAN CTE 417
Personal Call Manager application 417
Service Provider 417
TCM connections, base station 340
technical requirements documents 6
telecommunications company rights 6
telecommunications registration information 5
telephones
adding wireless units 325
ATA2 318
audio conference unit (ACU) 92
CAP 318
Companion overview 92
controlling from the PC 417
DECT overview 92
emergency 321
Etiquette C3050 CT2 portable 93
i2050 soft phone 417
IP telephone 92, 322, 417
M7000 91
moving 324
supported list 71
Symbol NetVision overview 92
T7100 91
T7208 91
T7316 91
T7406 92
Telephony Application Program Interface 417
telephony components 70
television reception 9
text conventions 35
time zones, by country 405
tools
shock warning 218
transmit clock 182, 183
transmit data 182, 183
trunk modules
BRIM S/T 79
CTM/CTM8 78
DTM 77

rules for assigning 127
TSP
overview 417
see LAN CTE
two-line display
T7316 91

## U

Unified Manager
keycodes 191
uninterruptible power supply (see UPS)
universal service code (USOC) 5
UPS, RPI 327
US regulations, FCC 7
using your equipment 10
UTAM 338, 341

## V

voice channels, changing the channel split 122
voice mail
feature defaults, by region 413
voice over IP 417
VoIP
Gateway 417
i2050 soft phone 417
IP telephone 92, 322, 417

## W

wallboards,Call Center Reporting 416
WAN
media services card 62
network standards 5
wiring 182
weight, installing on table 115
wide area network, see WAN
wire color 163, 169, 335
wireless
adding to system 325
base station installation 338
DECT module 87
handsets, Etiquette C3050 CT2, Companion 93
registering handsets, Companion 341
see Companion and DECT
wiring
RPI 332
WAN card 182